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FACTS, FICTIONS AND FALLACIES IN ORTHODONTIA

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In the war against reality man has but one weapon—Imagination.—Jules de Cautier.

ORTHODONTIC practice is concerned in every instance with the structural, functional and esthetic problems of some specific individual.

The human organism is the most highly developed, specialized, and complex combination of component factors in the entire universe. An individual is the direct result of his own peculiar heredity and environment, and is subject to a very wide latitude of perfectly normal variations as to size, shape, racial characteristics, etc. To say that an individual is *unique* is to state a very necessary biologic platitude, but it is purposely done at the outset because there is no more important fact to be considered in all orthodontic treatment. As such man is a link in a continuous series of human experiments on the part of nature. Brash has defined orthodontic treatment as "the art of experimental control of the experiments of nature."

A *control* or *ideal* as to the correct relation of the teeth and jaws is necessary for the purpose of concept, but its qualifications cannot be specified in terms of definite dimensions or exact anatomic relations. There is, furthermore, no reason, scientific or otherwise, why an individual should conform to any specific model or even come within the range of the average of a satisfactory group.

These are, however, *qualities* of such a universally desirable nature that as a component unit they may be quite clearly defined as the objectives of treatment and fulfill every requirement for a satisfactory dental occlusion.

These qualities are:

Structural balance,
Functional efficiency, and
Artistic harmony.

Read before the Southern Society of Orthodontists, Chattanooga, Tenn., January 25-27, 1937.

An ideal dental occlusion is one in which these qualities combine perfectly with a complement of thirty-two perfectly proportioned teeth. Angle's classification from the standpoint of teeth in relation to each other is as good as it ever was.

A careful study of the nature of these conditions, structural balance, functional efficiency and esthetic harmony, will point to the fact that they constitute in themselves a natural classification for malocclusions because they constitute the basic problems upon which decisions for treatment must be made.

These three conditions studied separately will reveal the factors which must be considered, the information we have concerning them, methods for making decisions, and the means which may be logically and reasonably employed in treatment.

Orthodontia is too vast in its scope for any practicing orthodontist to be much more than superficially conversant with the basic sciences which are involved, but he can compare the scientific facts which have been gathered by those who are eminently qualified to do this with his own practical experiences and observations, and come to some very logical conclusions as a working hypothesis for treatment. All true progress in orthodontia must come this way. The intelligent and clever clinician has no apology to make to his scientific collaborator.

It is to the everlasting credit of this Society that at one of its meetings, the "piece de resistance" was a consideration of Brash's work on the etiology of malocclusion. It is my opinion that Brash's work on this subject is the most comprehensive, intelligent and scientific study we have to date. His conclusions are so sound that they make untenable some of the theories which have been and still are used as the basis of treatment. The title of this paper might easily be termed "The Practical Application of Brash's Conclusions."

The object of this paper is to endeavor to show that by a simple, logical process of reasoning, the facts we already possess are sufficient to formulate a system of mental approach and correlated method of treatment which will be quite adequate for practical purposes, without the necessity of resorting to the use of any fictions or preconceived theories.

The essence of orthodontic treatment consists in the fundamental fact that every case presents a unique combination of structural, functional and esthetic factors of extreme complexity which call for individual decisions; that treatment consists in making changes within the limitations of each case and that these changes should be correlated at all times to the functional activities of mastication while they are being made. Orthodontia is a problem of dynamics from start to finish.

STRUCTURAL BALANCE

Structural balance depends upon a correct proportion of tooth substance to bony development when the latter has reached its limit of growth, in order to permit of a satisfactory alignment of the teeth. The amount of tooth substance inherited by the individual is determinable at an early age, but the amount of bony development to accommodate this tooth substance is not determinable until maturity by any scientific means as yet known or likely to be discovered in the future.

Brash says, "*Such evidence as we have of the inheritance of face and jaw form, all points to the genetic constitution as a primary factor.* There is evidence that extreme degrees of malrelations of the jaws and underdevelopment of the mandible are of the nature of real malformations and stand in relation to other regional malformations.

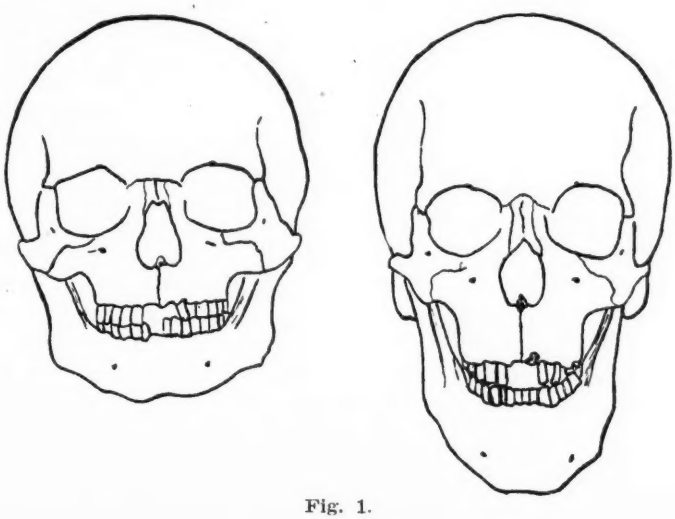

Fig. 1.

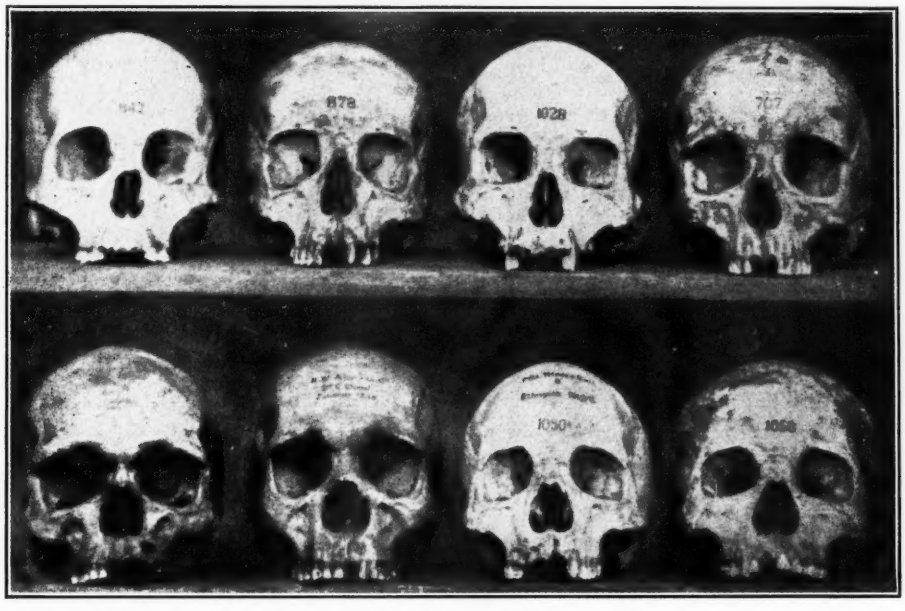

Fig. 2.

"*There is no direct relation between the teeth and the sizes of the jaws.* This is indeed the essence of the problem of irregularity and malocclusion."

In view of these facts there is not only sufficient reason, but an imperative necessity in many cases, of making every conceivable form of compromise which the possibilities and limitations of individual factors determine as the final object of treatment.

The clinician is perforce obliged to depend mainly upon his experience in clinical observation to make the tremendously important decisions which arise in cases of this kind. Although there is absolutely nothing definite to go by, as to individual cases, there is, nevertheless, much valuable information which can be gathered by a painstaking study of the gross physical characteristics of the patient. The apical bases of the teeth are of the utmost significance in this respect as only by their positions and relations to the basal bone can the amount of actual tooth movement be reasonably estimated. Studies of models alone can be exceedingly misleading in this respect.

The bony substance of the jaws is composed of basal bone and alveolar process; these two substances vary greatly in both volume and proportion to each other in different individuals. This is one of the reasons that account for the very great difference of resistance to tooth movement which exists between individuals, and the obvious limitations of tooth movement in some cases. Figs. 1 and 2 show in diagrammatic and actual form, this difference.

The size and shape of the basal bone cannot be altered very materially by treatment, as this is determined predominantly by the genetic factor. The disposition of the alveolar process can be changed quite considerably by mechanical means, but if the alveolar process is so changed as not to conform proportionately with the size and shape of the basal bone, no very permanent results can be expected. The possibilities and limitations of treatment are in most cases quite definitely determined by the shapes and sizes of the maxilla and mandible, and the best compromise which can be made in the arrangement of the teeth to each other, depending on these factors. A large proportion of the failures in treatment have been due to a disregard of these facts in efforts to obtain so-called ideal occlusions which, in many cases, are impossible of attainment.

In some cases the congenital absence of teeth, the extreme misplacement of certain teeth, and other factors are such that not only is ideal occlusion, but even a satisfactory occlusion, obviously impossible of attainment. As long as the orthodontist has obtained the optimum which the individual factors permit, he has done his full duty by the patient. Just what this is, is extremely difficult to determine as individual factors make fixed standards impossible. The application of ordinary common sense in a careful study of individual details, however, is often all that is needed to indicate quite clearly what may be estimated as the most desirable individual objective. If judgment is bad in this matter, no power on earth will prevent cases from being failures.

Adhering to a preconceived theory in this matter is probably the reason why Brash should have remarked that in one respect, at least, Angle has rendered orthodontia a distinct disservice. Certain it is that the amount of harm which can be done by accepting and adhering rigidly to an unsound theory by the unthinking is enormous.

In many cases, a satisfactory structural balance can be obtained only by the extraction of teeth, and the time is now past when it is necessary to make any apology for a means of treatment which is sound scientifically and in some cases a categoric necessity.

FUNCTIONAL EFFICIENCY

Functional efficiency depends upon a correct relation of the teeth to each other and their orientation to the skull as a whole, in order to permit of a satisfactory excursion of the mandible in the function of mastication. The ideal positions of the teeth to each other are well known and accepted, but their relative positions to the skull are still quite hazy.

The positions of the teeth to the skull have sagittal, anteroposterior, and vertical relations. What the composite of these three should be to the skull is as yet problematical, but it is logical to infer that it should be quite as variable as the characteristics of the individual himself. Of the three dimensions it is obvious that the sagittal positions of the teeth should conform as nearly as pos-

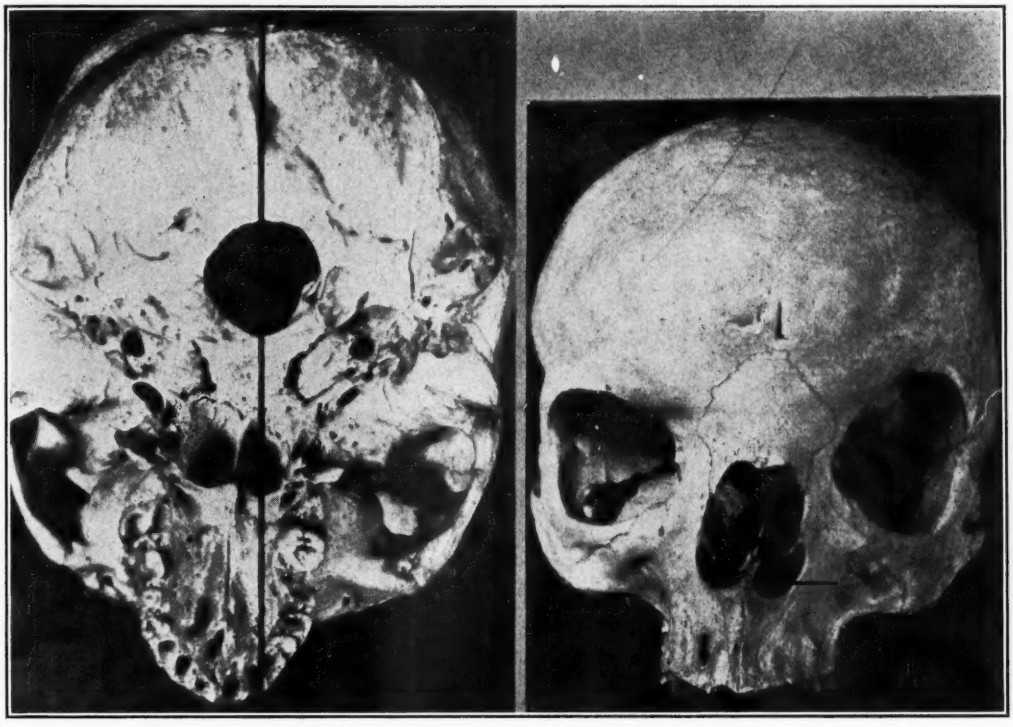

Fig. 3. Fig. 4.

sible to the median sagittal plane of the skull. To determine this median sagittal plane, however, is not easy, if at all possible; Figs. 3, 4, and 5 show this difficulty. This is not vital either for functional efficiency or for esthetic reasons, and furthermore, in most cases, cannot be altered to conform to any such ideal by any purely intraoral forces. It is quite obvious that it would seldom, if ever, be desirable to employ extraoral force for this purpose. The same argument holds good for the other two planes.

From a gnathostatic standpoint Brandhorst has shown how much the anteroposterior relations may vary, in some cases apparently quite satisfactorily (Fig. 6). Stanton has shown by measurements that the disharmony in tooth substance between jaws is also very common. Nature herself does not seem to adhere to any mathematical precision in producing her individual specimens; so why should

an orthodontist concern himself too seriously about such matters? Of the many theories on the subject of orientation, it would seem that an arrangement which conforms to the curve of an arc or segment of a sphere, as illustrated in Fig. 7, seems about as logical as any, as this arrangement is the most efficient from the standpoint of function and appears to be the most pleasing from the standpoint of esthetics.

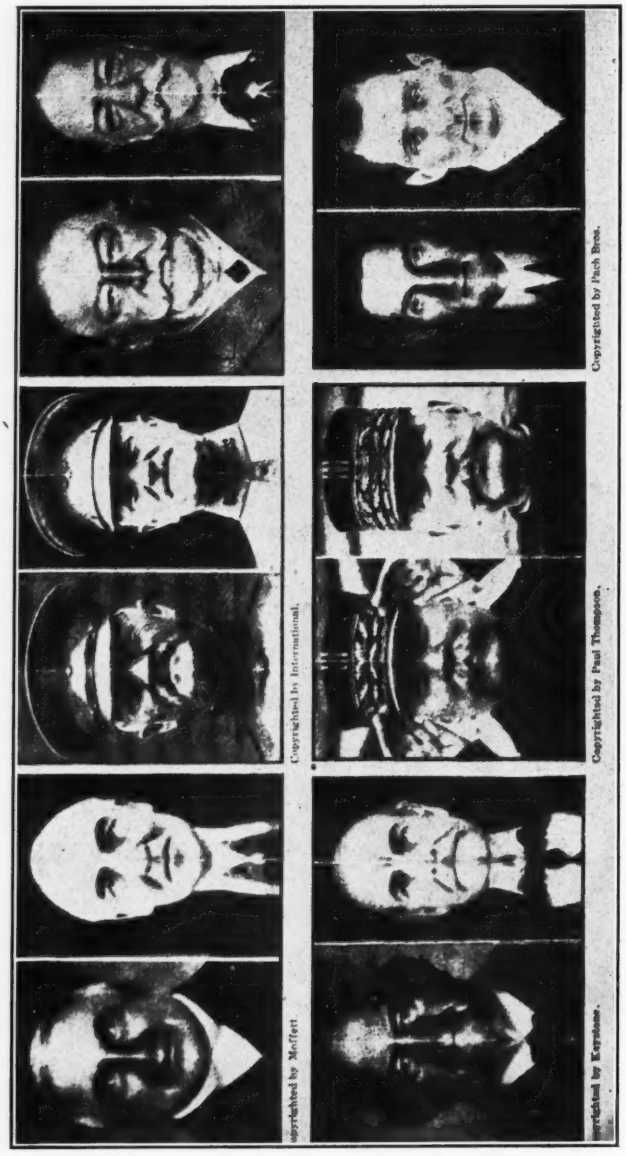

Fig. 5.—"Few persons are exactly alike on the right and left sides." These odd pairs of twins show the striking difference in the right and left sides of faces of well-known people. The first picture in each case shows the right side combined with a reverse photo of itself to make a complete portrait, while the second picture shows the left side treated in the same way. "Such persons, in the view of some biologists, may be regarded as halves of twins, grown together."

When the main problem is a question of the relation of the jaws to each other, the question is, to a great extent, determined from the functional standpoint, by the possibilities and limitation of the psychic reactions and muscular control of the patient. The world is full of examples of individuals who have completely changed their physical characteristics or endowments by sheer will to do so. The ability to change the relation of the jaws to each other is by

comparison one of the easiest changes that can be made in the whole anatomy, and is best accomplished by an inspired desire to do so on the part of the patient, the seed of which can be planted by the orthodontist. Not to realize this is to throw away one of the greatest means of treatment. In order to accom-

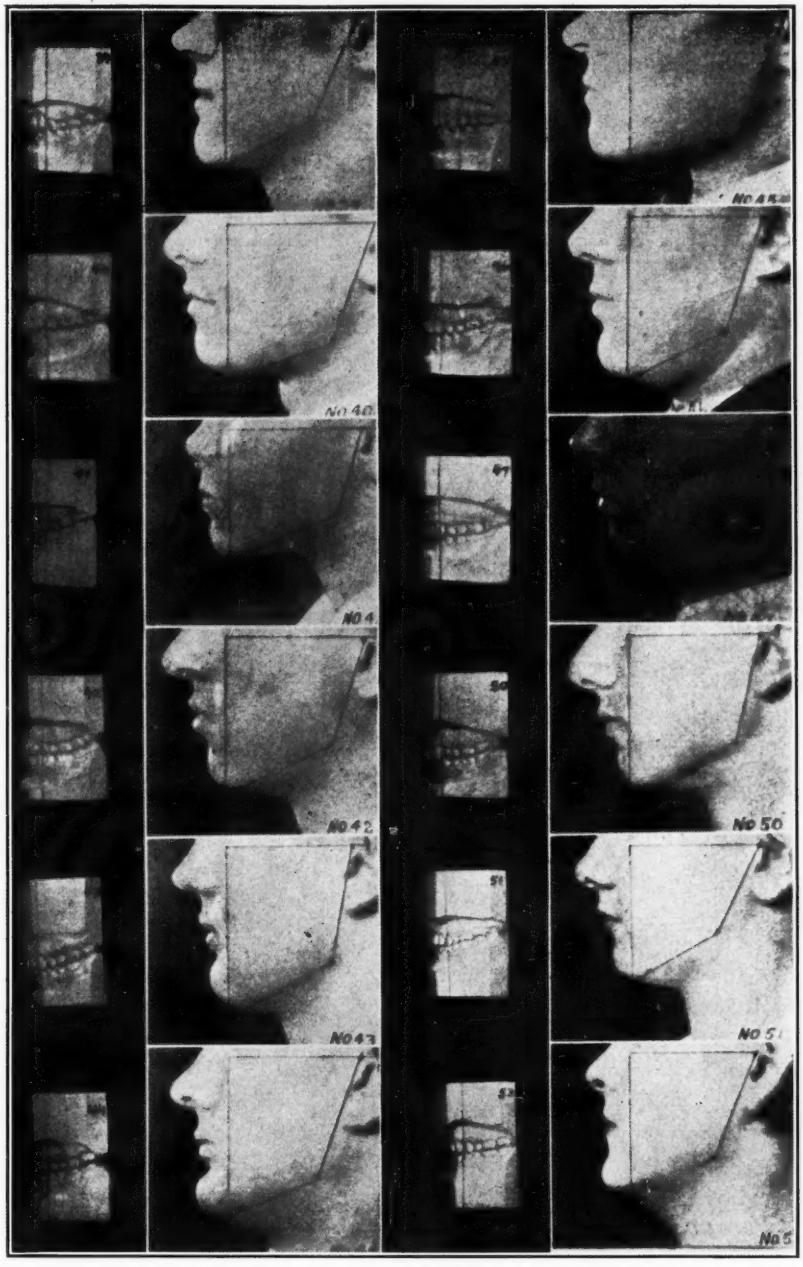

Fig. 6.

plish this to the best advantage, however, it is in most cases desirable to make some changes in the position of the teeth so that this can be accomplished with the greatest ease, as the patient will always function naturally in the position of greatest comfort. A study of the functions of the individual and the dis-

position of the teeth will usually disclose what these changes should be with such clarity that they are often of almost ridiculous ease of detection. The use of appliances to act as reminders to alter function is of the greatest value.

ARTISTIC HARMONY

Artistic harmony is a question of proportion in the shape, size and orientation of the dental organs as a whole in their relation to the other facial factors. Beauty is indefinable, but one of its main attributes is a correct proportion of its component elements. This is an artistic problem of such a subtle nature that it is questionable if its objectives can ever be definitely measured and estimated in scientific terms for orthodontic purposes.

In this, again, the orthodontist is faced with the limitless combinations which the component elements of an entire head and face are capable of producing.

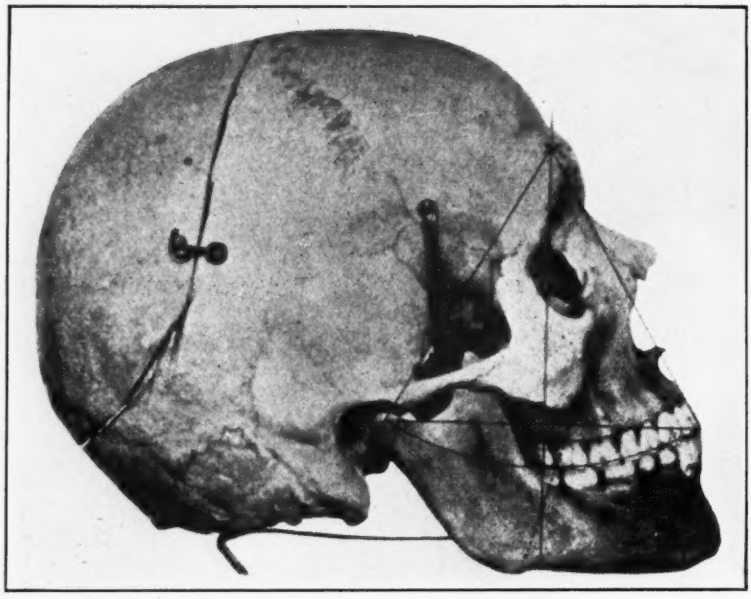

Fig. 7.

It is not only desirable, but absolutely necessary at times, to make every conceivable compromise which structure and function will permit in order to obtain the most desirable results. Bony anatomic landmarks are purely relative in value and are not much help from the artistic standpoint which, in facing its problems, *must of necessity include all the soft tissues of the face* with all their peculiarities of size and form. There are cases which have come under my own observation in which the structural balance and the functional efficiency could be considered satisfactory but in which the artistic harmony was anything but satisfactory, offering problems of the utmost difficulty of solution.

TREATMENT

Treatment is concerned with the infinite number of combinations which the three named conditions, with their limitless variations and factors, can produce. The problem is naturally one of extreme complexity. The more complex a

problem is, the more desirable does it become to think of it in terms of the greatest simplicity so as to avoid confusing unimportant details with main issues. Brash says, "Science proceeds by the controlled use of the imagination applied to preliminary data whereby provisional hypotheses are formed. Scientific caution can easily be overdone." To be specific, the orthodontist is confronted with the problem of determining the most desirable objective for his individual case, within the possibilities and limitations of the case, and to apply the most efficient means to accomplish the desired result. The factors involved

Fig. 8.

Fig. 9.

are so many and varied and the scientific means of estimating them so limited that the only satisfactory method to estimate desirable changes is by a painstaking clinical study of the patient both in repose and in function, and allowing judgment to be guided by the use of creative imagination. There is no entirely satisfactory means of transferring the necessary data to any articulator or series of graphs.

Charles Dickens was expressing a sincere conviction, borne of experience when he said, "My imagination would never have served me as it has but for the habit of common-place, humble, patient, daily, toiling, drudging attention." There are no short cuts to orthodontic wisdom. Orthodontic treatment is essen-

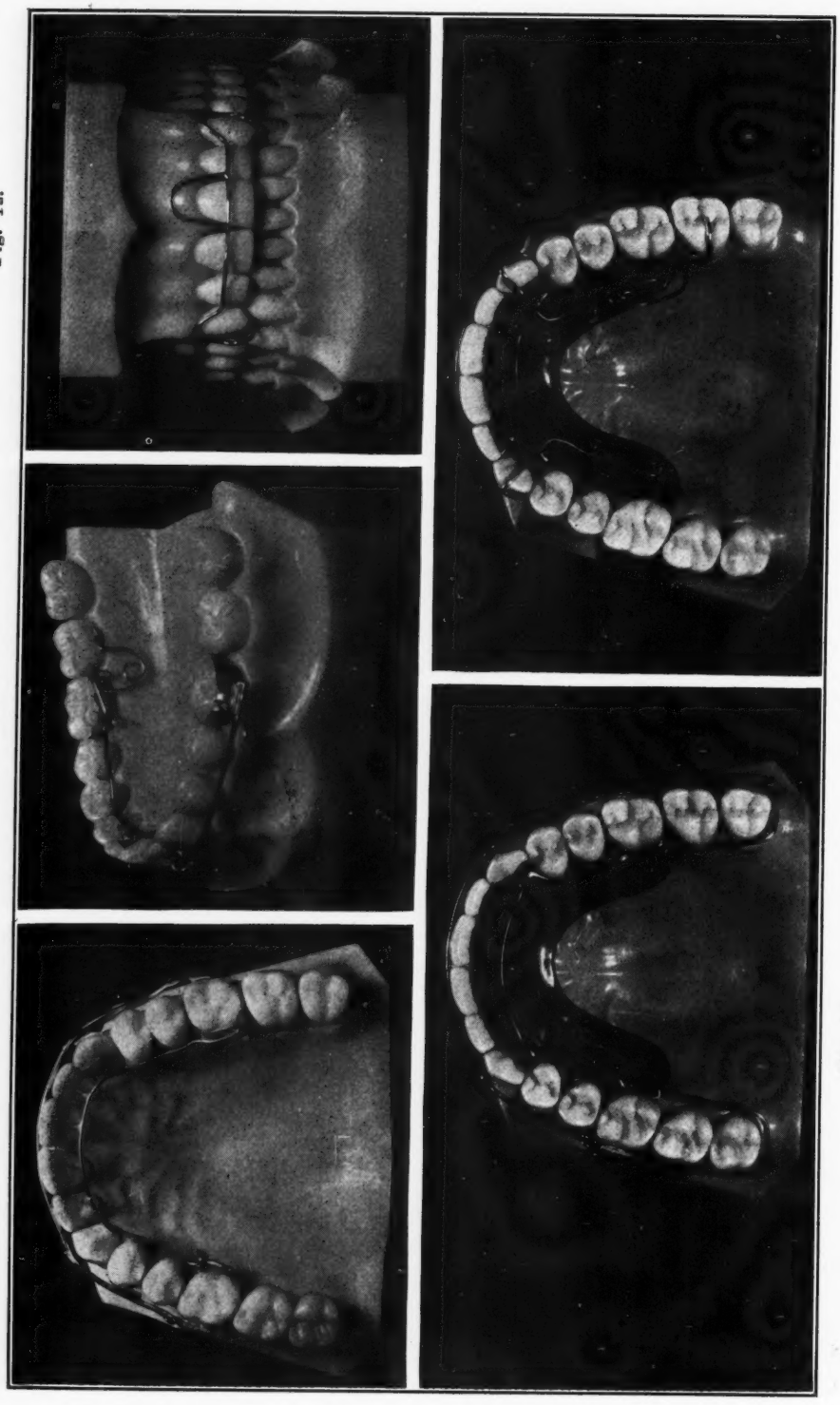

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

tially the application of certain logical concepts easily understandable, applied to an exceedingly complicated set of details. All this may sound very indefinite. Theoretically it is. Actually it is not nearly so complicated as it sounds, and fortunately there are a few general principles which, if applied with ordinary common sense, are so universal in their application that when put to work intelligently, point out in themselves just what steps are most desirable and the order in which they should be taken.

All this leads to the exact method of procedure which I employ in the treatment of my own cases and have found it so infinitely and incomparably more satisfactory than any other method, that it constitutes the main motif of this paper.

Regardless of *what* the type of malocclusion may be, a careful study is made of the three basic conditions named at the beginning of this paper and these are studied not only singly but in combination. If the mesiodistal or buccolingual relation of the jaws is incorrect, the patient is then requested to move the jaws until a point is found which might be assumed as the most desirable or, as

Fig. 15.

Rogers might have called it, "the position of mechanical advantage." This position is then studied with the utmost attention to detail with the object of determining with the greatest accuracy, the mechanical interference which may be present to prevent this more desirable relation of the jaws from being maintained habitually. After this is definitely determined, if mechanical interference is indicated, then a mechanical appliance is devised which will most efficiently take care of the *immediate problem on hand.* The reactions and interactions to treatment are unpredictable, notwithstanding that certain results are expected, so that after an appliance has accomplished its purpose and a careful study is then made of the changes which have taken place, a complete reevaluation should be made and each future step handled in the same manner. At all times during treatment, the relation of the jaws to each other should be thought of in terms of a functional unit, and their correct relation to each other, when this is determined upon, should be accomplished at the very earliest moment. A painstaking study of the individual details of every case during this period of transition will, in most cases, minimize traumatic occlusion and make the progress

of the work a logical sequence of steps. Appliances which include the collective movement of many teeth at the same time are, therefore, quite illogical if this point of view has any basis of common sense.

The most interesting way to elucidate any point is to get down to cases, which I shall do by presenting a number of case reports involving certain decisions

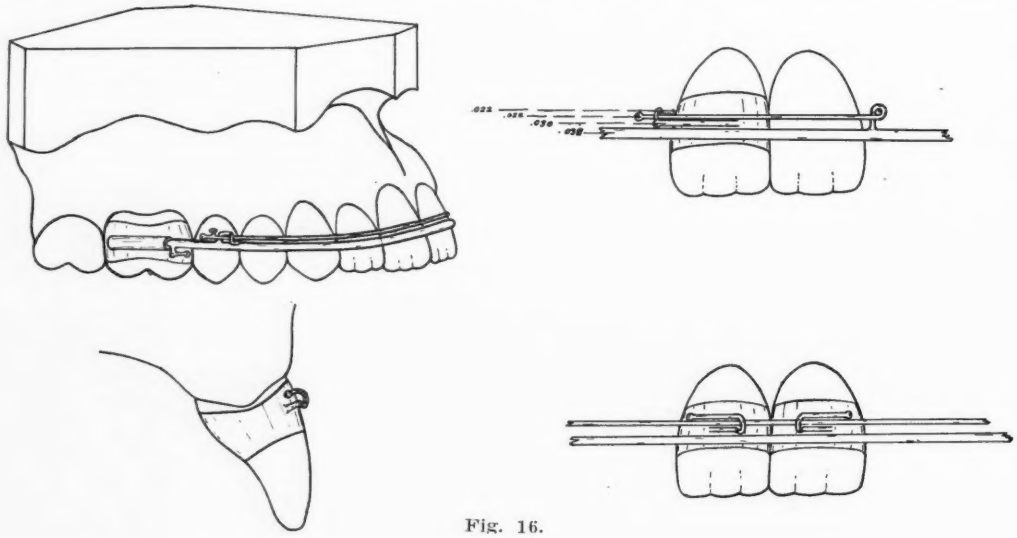

Fig. 16.

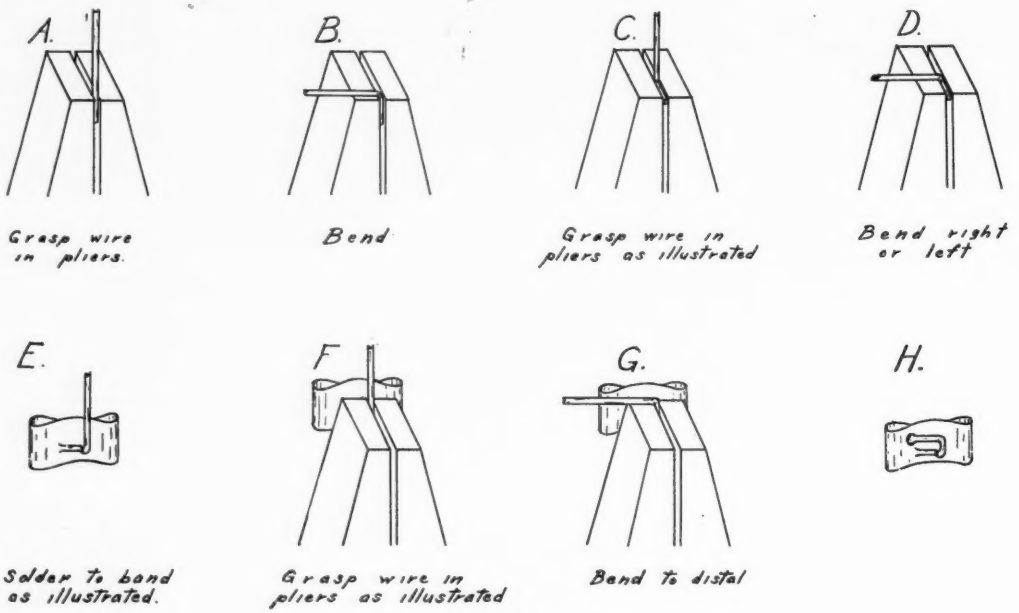

Fig. 17.

which had to be made, and after these were made the methods used in treatment. Before doing this, however, I wish to present a few photographs of certain improvements which I have made in appliances which I have found most useful in my own practice and which I have described in detail in previous articles. Like automobiles, the principles remain the same but the models improve from year to year. The bracket hooks which I have described previously are still as

efficient as ever in conjunction with the labial auxiliary spring, but instead of tying the labial spring in place, the bracket hook is now bent horizontally and after the labial auxiliary spring has been placed in position the end of the bracket hook is further bent lingually so as to prevent the labial auxiliary spring from becoming displaced. This very simple change has made a most satisfactory lock for the labial auxiliary spring. This is illustrated in Fig. 8.

Rotations can be most satisfactorily produced by the appliance shown in Fig. 9. This method is particularly useful in conjunction with retainers after the active treatment has been completed. In some cases the band on the rotated tooth need not be cemented into place but can be slipped on and off by the patient and worn at night only. This method meets with great favor among

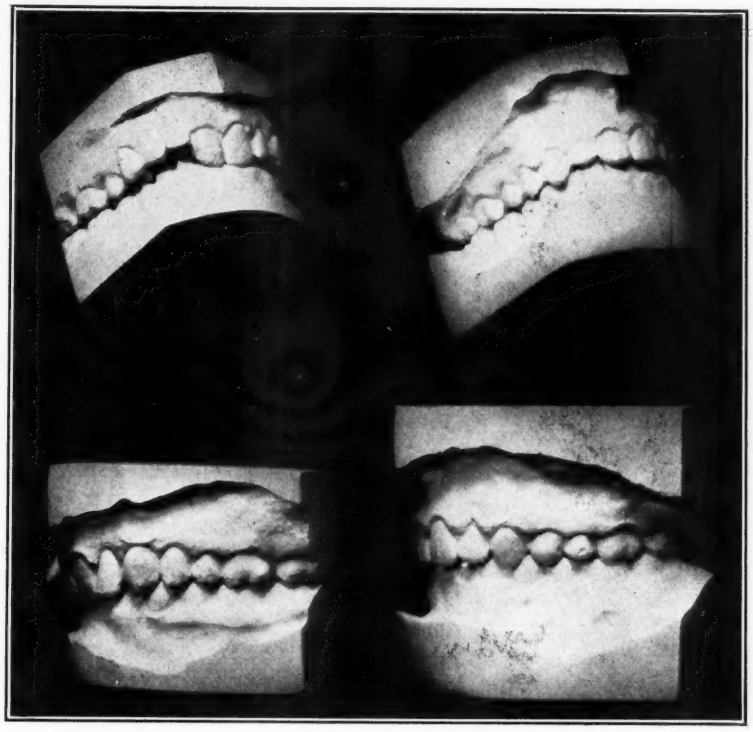

Fig. 18.

the debutantes. I have used this method to produce a very extensive rotation without ever having cemented the bands in place and with proper prophylactic care, without having done any damage to the teeth. Figs. 10-17 inclusive show some appliance constructions which speak for themselves.

Fig. 18 shows the models before and after treatment of a case which was reported a number of years ago, and which represents a case of very deep overbite in conjunction with other malpositions of the teeth which produced a condition of unilateral distoclusion. The rearrangement of the teeth, carefully studying the relation of the jaws to each other, was not difficult to accomplish by means which I have described in detail in previous papers, but the permanent improvement of the deep overbite which would permit a satisfactory excursion of the mandible offered a problem of which there is a difference of opinion among

orthodontists. Oppenheim and Mershon are somewhat pessimistic. I have found, however, that the use of bite planes over a long period of time apparently is entirely satisfactory and seems a logical method of dealing with this problem. There is absolutely no tendency whatsoever toward relapse. In fact, it is impossible for the patient to bite at present in a position of distoclusion. Just what changes have taken place I do not know, but certain it is that the patient, at present, has an exceedingly satisfactory mandibular excursion which would seem quite obvious from the relation of the jaws as shown in Fig. 19.

It is to be hoped that the magnificent work which Broadbent has done will throw a great deal more light on this problem and indicate the best methods of

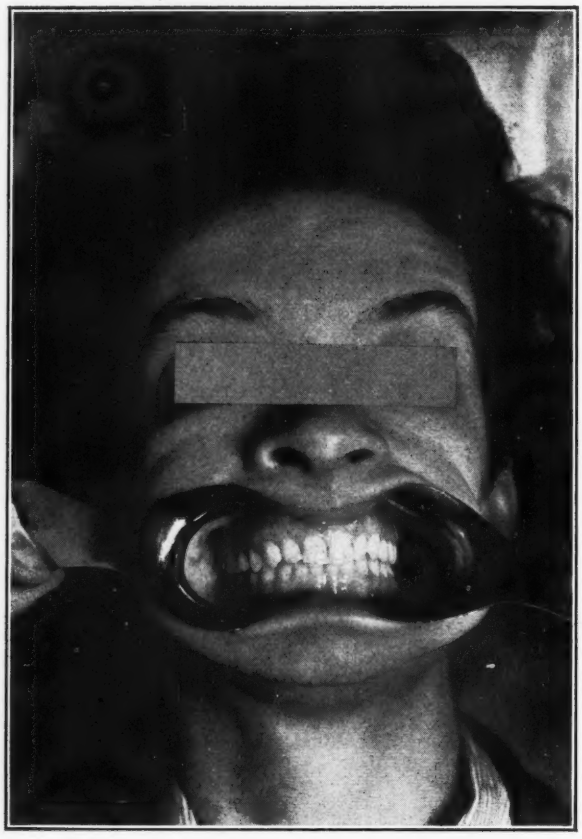

Fig. 19.

treatment under these circumstances. The use of bite planes of an infinite variety is one of the greatest assets which I employ in my own treatment of cases.

Figs. 20-22 show the models of an ordinary case of distoclusion. In this case a study of the three basic conditions for a satisfactory occlusion was made, and I determined that all the conditions were favorable to attempt an ideal arrangement of the teeth. Following the line of reasoning which I have described, a bite plane as shown in Fig. 13 was used in conjunction with fixed appliances. The actual bite plane which was used is shown in Fig. 21. The insertion of this bite plane immediately opened the bite as shown in Fig. 21, so that the right

and left first premolars which were in buccoclusion to the mandibular teeth were immediately thrown out of occlusion, allowing the readjustment of the relation of these teeth to the mandibular teeth without trauma while this movement was taking place. In addition to this it is obvious that when these teeth were brought into position of mechanical advantage, the main interference was the supraclusion of the incisors. The bite plane acted, therefore, as a most efficient device

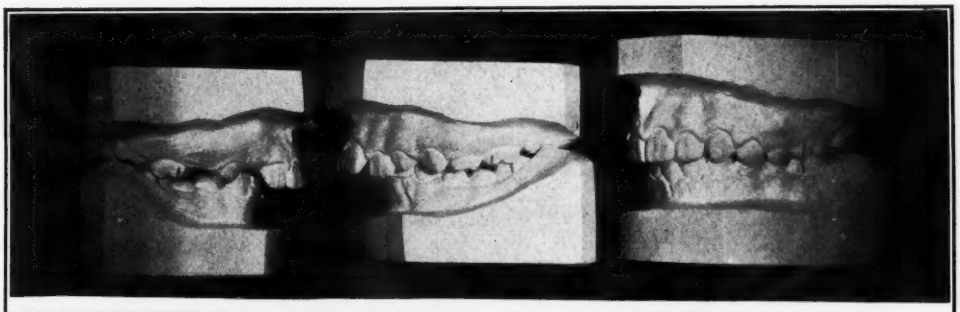

Fig. 20.

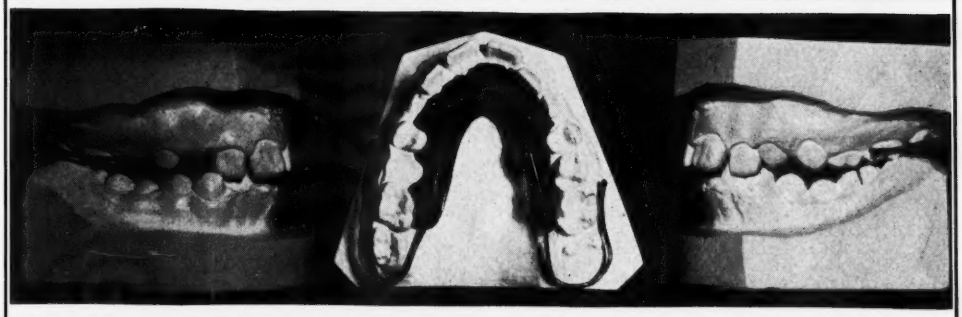

Fig. 21.

Fig. 22.

to overcome this condition and at the same time act as a reminder to the patient of what the correct relation of the jaws should be. The manner in which cases respond by means of this method is, in some instances, amazing. The casts at the right of Fig. 20 show the models of the case only seven months after treatment was started.

Figs. 23-26 show photographs of the patient with some of the fixed appliances in place. Fig. 24 shows a fixed bite plane which was used to replace

the removable, due to the fact that some changes had been made in the positions of the erupting teeth which the vulcanite bite plane was interfering with. At

Fig. 23. Fig. 24.

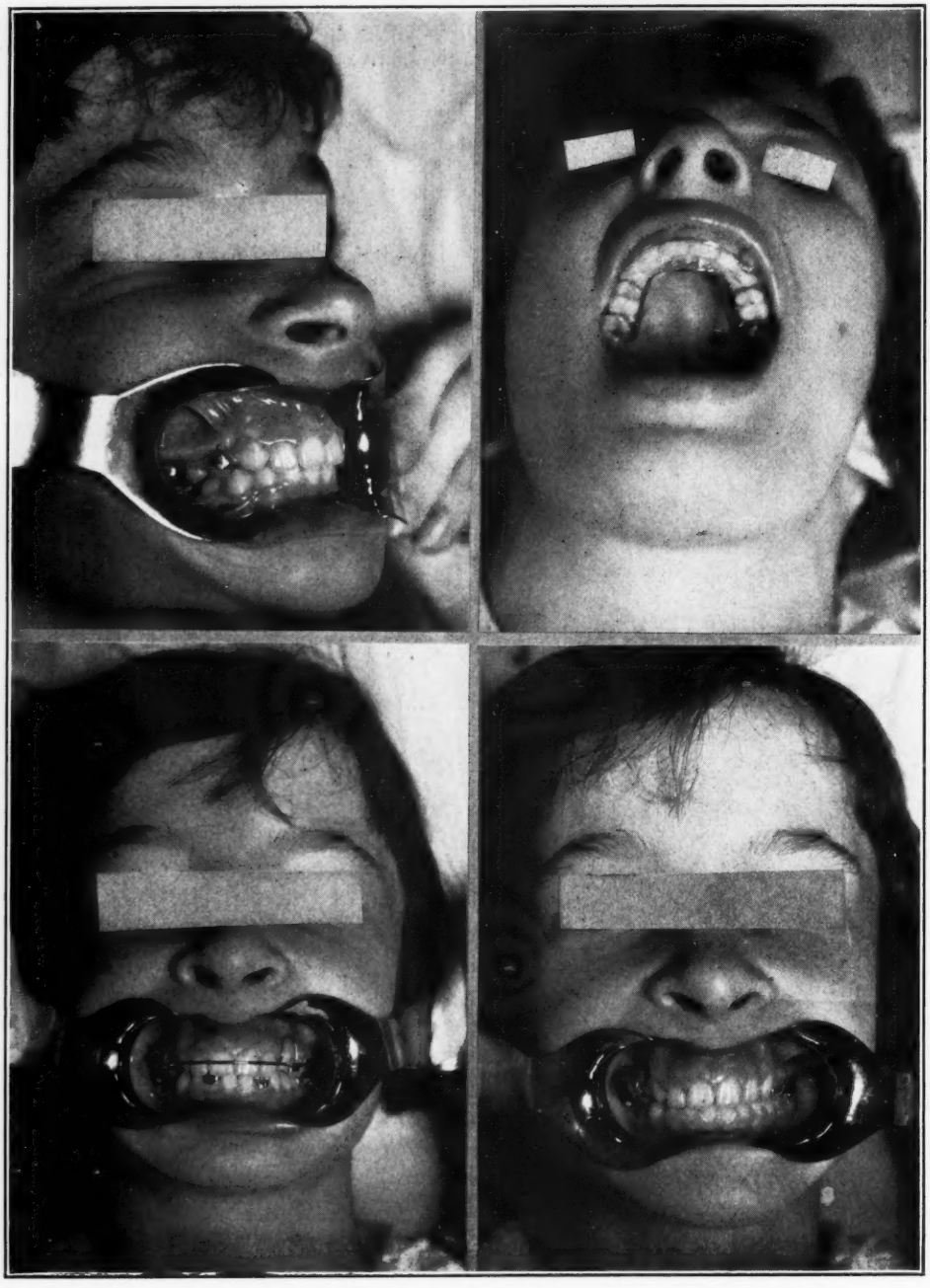

Fig. 25. Fig. 26.

the present time it is impossible for the patient to occlude comfortably in any other position than that shown in the photographs, showing, in my opinion, that some extensive changes have taken place in the structure of the bony elements. The condyles are apparently again in the glenoid fossae, though it was quite

Fig. 27.

Fig. 28.

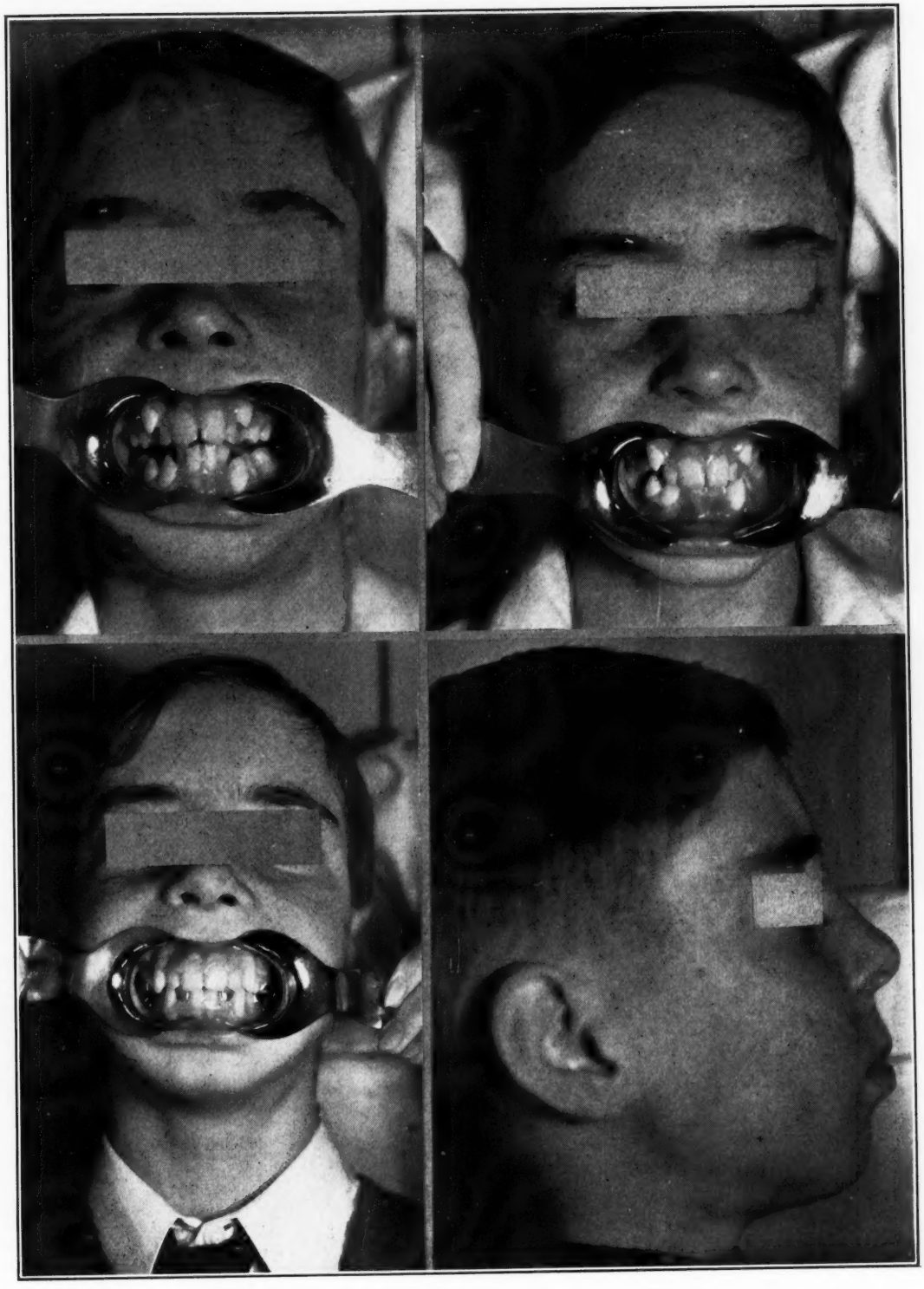

Fig. 29.

Fig. 30.

apparent that at the beginning of treatment in order to assume a desirable mesiodistal relation they had to slide forward on the eminentia articularis.

Figs. 27-30 show a case in which the main trouble was physical disharmony in the structural proportions between the tooth substance and the bony development. The relation of the first permanent molars was satisfactory. The mandibular second premolars were congenitally absent. Taking all the factors into consideration, therefore, the two maxillary first premolars were extracted and a readjustment made of the remaining teeth. The result is shown in Fig. 29. Taking into account all the gross physical characteristics of the individual it is my opinion that this was the best compromise to make in this case. Fig. 30 shows the profile of the patient after the changes had been made. It is also my own personal opinion that neither the structural balance nor the esthetic harmony of the face would have been improved by attempting to make room for thirty-two teeth in a case of this kind.

Figs. 31-35 represent a case in which a decision to extract the maxillary first premolars was made. The reasons for this were several. From the standpoint of facial harmony, the protrusion of the maxillary incisors in combination

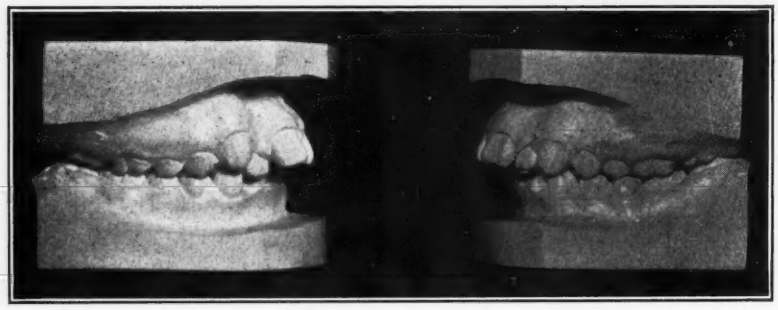

Fig. 31.

with the excessively short upper lip, combined with the position of the root apices of the maxillary incisors, made this a desirable compromise. In addition to this, a careful study of the forward excursion of the mandible disclosed the fact that when this position was assumed it produced a condition of open-bite, a condition which would produce serious difficulties in treatment. Furthermore, a study of the profile showed that, when the forward position of the mandible was assumed, the lower lip produced a condition which was much worse than the position of repose shown in Fig. 34. It is obvious that the facial balance is unsatisfactory, but it is questionable whether any further great improvement can be made or whether an attempt to produce an ideal occlusion of thirty-two teeth in this case would not have made things worse. The improvement so far has been very pleasing to the boy's parents. Fig. 32 shows the relation of the teeth, and Fig. 33 some of the appliances which were used in treatment. It will be noted that labial auxiliary springs were used on the mandibular lateral incisors. The reason for this was that the case had a great tendency to develop a condition of open-bite, and this is one condition which should be avoided at all costs. I know of no appliances which will produce this undesirable condition more effectively than mandibular lingual arches with unsupported finger springs on the incisors.

Fig. 32. Fig. 33.

Fig. 34. Fig. 35.

Figs. 36 and 37 show a case of deep overbite which was treated by means of labial auxiliary springs in combination with bite planes. The removal of the

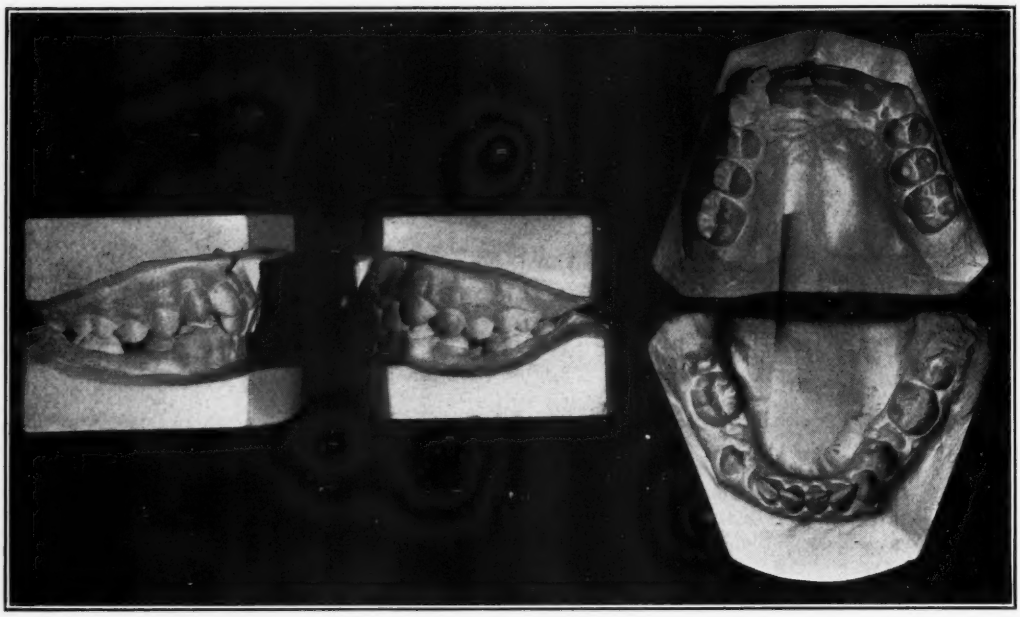

Fig. 36.

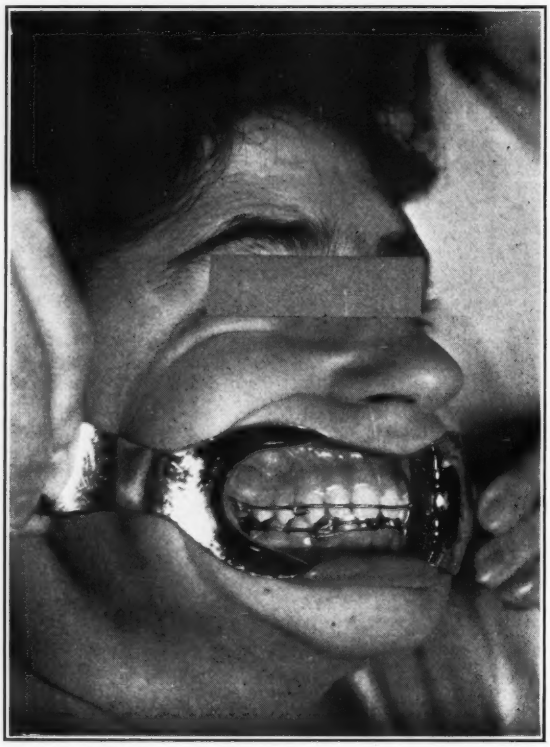

Fig. 37.

mechanical interference, both horizontal and vertical, of the incisors was the first consideration, after which the moving forward of the mandibular incisors was effected without traumatic occlusion. The rotations of the mandibular

canines was effected by means of the appliances shown in Fig. 37. It is apparent from this photograph how much the mandibular excursion has been improved by treatment.

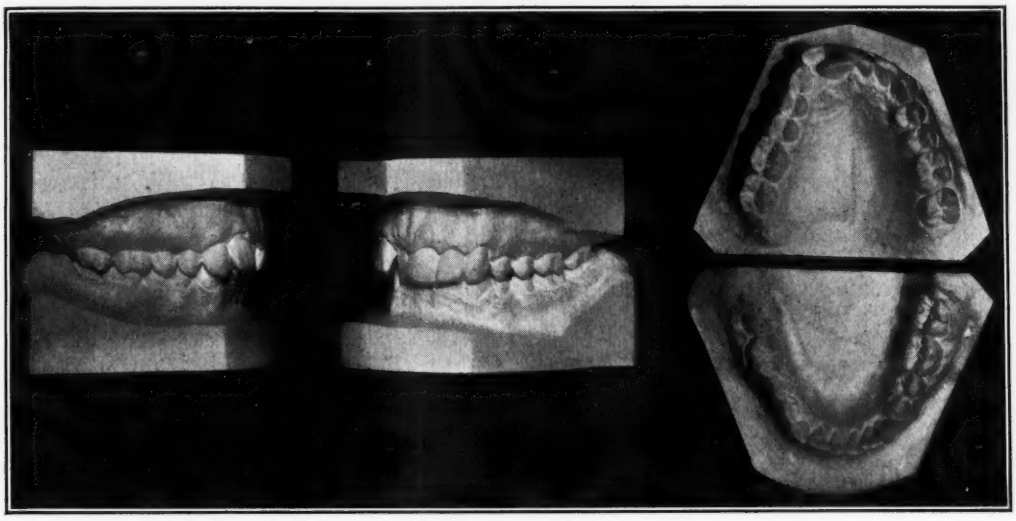

Fig. 38.

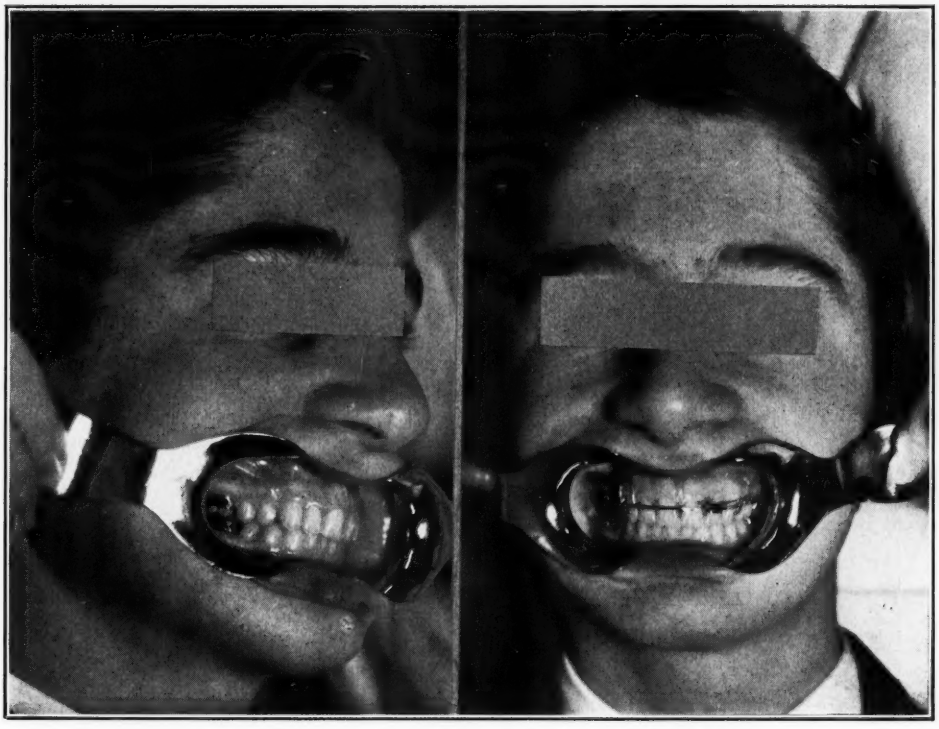

Fig. 39.

Fig. 40.

Figs. 38-40 represent a case of distoclusion with extensive crowding of the maxillary teeth. In this case, as in practically all cases, the simple procedure of placing the maxilla in its correct mesiodistal relation indicated clearly and concisely, step by step, just what the interferences were which impeded the maxillary teeth from assuming their correct relations. In this case treatment

was started just before the boy went away for his summer vacation of about three months. The two maxillary canines were banded, and auxiliary labial

Fig. 41.

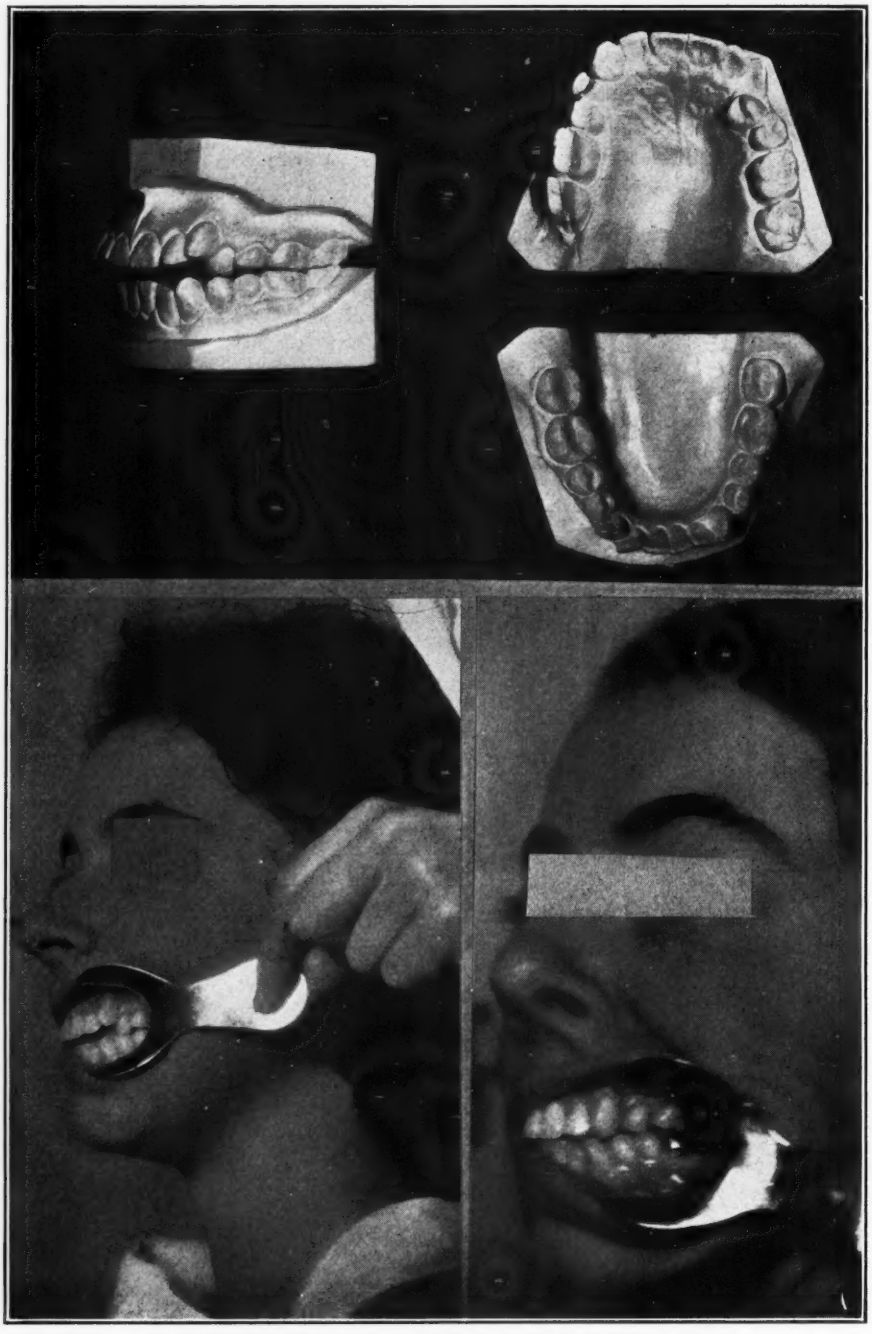

Fig. 42.

Fig. 43.

springs were employed under bracket hooks to produce buccal movement. This is the most satisfactory means of moving canines that I know of. The movement is positive, gentle and continuous, and after the crowns of the teeth have been brought into position against the labial arch, there is still further root move-

ment for as long as there is pressure in the auxiliary spring. After these teeth had been moved so as to permit of the correct relation of the teeth, it was amazing how little intermaxillary force was needed to change the position of the mandible. Fig. 39 shows the improvement which was made, and Fig. 40 some of the appliances which were used in producing these changes.

Our most valuable clinical information is obtained from practical results. Figs. 41-43 represent the condition of affairs of a case which had already undergone five years of orthodontic treatment. The result could hardly be considered satisfactory. Several reasons for this were quite apparent. It would seem logical, from a study of the apical bases of the teeth, that it was not possible to accommodate all the maxillary teeth in the amount of bone available without running grave risk of producing root or bone absorption. It would seem that the limit had been reached in the matter of mechanical stimulation.

The mechanical devices employed in this case were lingual arches with unsupported lingual springs used at intermittent intervals. The selection of these appliances and their method of application is also open to question from a clinical standpoint. Every clinician knows that there is no condition more difficult to deal with than open-bite, so that any appliance which shows any tendency to produce this condition in any given case should immediately be discarded. Naturally, when there is a deep overbite, an appliance which will have a tendency to open the bite is indicated. Lingual arches with unsupported finger springs exerting pressure against incline planes of teeth, from a purely mechanical standpoint have a tendency to depress the teeth acted upon and reciprocally tilt the anchor teeth. This is precisely what happened in this case. From a histologic standpoint, the intermittent treatment method is also open to very serious question. Several prominent histologists are of the opinion that when treatment is discontinued the bone which has been under stress consolidates into a more dense condition than the original untreated bone. Therefore, when treatment is again taken up, the mechanical problem of tooth movement is more difficult than at the beginning of treatment; and if this is continued over a long period of time, it produces a condition in which tooth movement can be accomplished only with the utmost difficulty. To re-treat a case of this kind is a misfortune for anybody. Figure 43 shows what was accomplished after the removal of the two first maxillary premolars and the retraction of the maxillary incisors. This was accomplished with the utmost difficulty on account of the histologic make-up of the bone.

There is still much in orthodontic treatment which, at present, is purely a question of personal opinion. I believe that appliances should be devised with a certain amount of ingenuity for *each successive step in treatment so that the movements of the corresponding teeth in the maxilla and the mandible are correlated;* that the *objective of treatment* be not over-reached after a careful study of the possibilities and limitations of the case, however short this may be from the ideal; that it is desirable to institute treatment which should be gentle and continuous, not only until the objective has been obtained, but to a certain degree beyond that, to allow for a certain amount of natural relapse. After this has been done, retention appliances are perfectly logically indicated until the bony elements have again reached a condition of histologic balance.

FACTORS WHICH DETERMINE THE ESTHETIC AND FUNCTIONAL POSITIONS OF TEETH*

DAVID W. MCLEAN, D.D.S., F.I.C.D., LOS ANGELES, CALIF.

DURING the past quarter century, orthodontics has made marvelous advance. The principles for the application of therapeutic force crudely used in the slot and plate for root movement by Victor Hugo Jackson, have been greatly improved and refined by E. H. Angle, in the modern ribbon arch. The principles used by Calvin S. Case have been similarly improved by McCoy in his open tube appliance and by Angle in the edgewise arch appliance.

Each of these appliances did some things exceedingly well and others not so well. Atkinson has combined the principles of the ribbon and edgewise arches into one appliance, using the good points of each; making the good points of one cover, and compensate for, the shortcomings of the other. Delicate and very resilient wires of stainless steel have come into use; and the result of all this is that therapeutic force can now be applied with a delicacy, precision and control never before possible.

Instead of moving teeth by brute force, through bone change processes almost, if not quite, pathologic, you are now able to induce bone changes almost physiologic in character, closely resembling those of normal bone growth. You have indeed traveled far in the past quarter century; the average general practitioner has no idea how far.

Meanwhile, general practice has been advancing also. General practitioners have become aware that their function is not merely the patching of teeth, but the maintenance and restoring of general health, as far as it is affected by the mouth and teeth; that they must look always beyond the teeth they are treating, to the patient of whom the teeth are an integral and very important part. The general practitioner has become aware of the slow, subtle progress by which minor dental pathoses become major dental calamities and general health menaces.

This advance in the concept of general dental practice has been difficult to achieve. You can follow a case of typhoid, scarlet fever, diphtheria or appendicitis from its inception to its culmination in a few weeks or months. But to trace a case of paradontosis (pyorrhea) back to its beginning, you may have to go back to prenatal diet, and follow through the development of malocclusion, of initial caries and recurrent caries, to the development of acquired occlusal deformities which break down the periodontium. To trace periapical infection to its real beginning, you may have to go back again to prenatal diet and follow through

*Read before the annual meeting of the Pacific Coast Society of Orthodontists, San Francisco, Feb. 24, 1937.

the inception of caries, through its insidious progress to pulp involvement, periapical infection and focal infection disease.

Today we realize that all departments of dentistry are combating three basic dental diseases: caries, paradontosis, and masticatory inability. They are the three most universal diseases in the world today, which should give all departments of dentistry much food for thought!

In the modern concept, prevention of these three basic diseases is the dominant urge. But the prevention of focal infection disease lies not in extraction of pulpless teeth and in vaccine treatment, but in the prevention of caries in childhood and in the prevention of *the progress of caries* throughout life. The prevention of paradontosis is quite largely wrapped up in the prevention of abnormal occlusal relationships, either acquired or those of inherent malocclusion, which throw pathologic occlusal force on some teeth while others suffer from disuse atrophy. The prevention of masticatory inability is wrapped up in the same basic considerations, plus the necessity for maintaining masticatory ability in every restoration made, from the smallest pit filling to the full denture.

The good automobile driver watches the road, not immediately in front of the bumper, but two blocks ahead. Every move he makes is guided by the traffic situations developing two blocks ahead of him. Likewise, the modern dentist must have his mental gaze focused ten to twenty years ahead, and shape his every act by its long range potentialities for dental, oral and general health or disease.

While orthodontists have been advancing their own peculiar problems, general dentistry has been advancing these general problems, and at the same time analyzing and understanding more fully than heretofore the factors which produce nonantagonistic and efficient masticatory function. Today neither of these two departments of dentistry sufficiently understands the other. And this leads us back to orthodontia's present economic problem, which is one of our first considerations concerning the esthetic and functional positions of teeth.

Put yourself, for a moment, in the place of the general practitioner. You have referred a child to the orthodontist, not as promptly as you should have, perhaps, because of your unfamiliarity with orthodontic prevention and diagnosis. But you referred the child and now, after two or three years, she returns with bands removed and teeth in very pretty alignment.

You examine this child's mouth, and see a few teeth rotated or in wrong axial inclination, so that instead of point interproximal contacts, they have broad surfaces in contact, and you know that for the rest of this patient's life you will be struggling to control caries in those locations.

You see a tooth or two so inclined that their gingival crevices are laid open to the direct impact of food; you see teeth lacking contact and unable to protect the interproximal supporting tissues. And you know that for the rest of this patient's life you will wage a losing fight against paradontosis in those areas. Or you may note that the child looks "toothy"; that the dentures are in double protrusion. And you know that the anterior teeth are lacking in periodontal support—that you will wage a losing battle with paradontosis throughout the patient's adult life.

You then direct the patient to move her mandible to the right and left lateral functional positions, and it immediately becomes apparent that the child does not know her way to those positions; that the orthodontic treatment has been based upon static centric closure, with no regard for occlusal contacts in the functional jaw movements of mastication.

The child "rides the cuspids" in the lateral jaw movements, and when the jaw is moved to protrusive relationship, proves to have a deep overbite, the entire force of jaw closure falling upon the anterior teeth, while the posterior teeth are wide open. And you know that the child will have limited masticatory ability throughout life and paradontosis, impossible to combat, in middle and later life. "Shucks," you think, "I could have done it better myself."

The parents of two children who need orthodontic treatment are importuning you to administer it, claiming that economic reverses have made it impossible for them to pay an orthodontist's fees; and recalling this lately returned patient, and the blank spaces on your appointment book, you decide to brush up on orthodontic technique and carry these new cases through yourself. For, as a general practitioner, you are unaware of the complexity of modern orthodontic technique.

If, when the orthodontist has moved teeth into perfect alignment, we could say "and they all lived happily ever after," and close the book, orthodontic treatment today would be a 100 per cent success. But we cannot do that. Life must go on. The child's dentures must be maintained in health by the general practitioner and must perform their important functions throughout long years to come. So we must accept a new concept of orthodontics, and realize that it is not only important to know *how* to move teeth, but also *where* to move them, and *why*.

At birth, the occlusal surfaces of the permanent first molars are calcifying; the forms are laid down and cusps are being built to definite dimensions and angulation. Six years later these teeth will erupt, will find the level of occlusal contact, and each cusp of one will fit into a sulcus of the other. Moreover, each molar will cooperate with its opponent during the functional movements of the jaw, for these occlusal surfaces are developing in harmony with the future movements of this child's temporomandibular joints; and the teeth will erupt into positions harmonious with the joint movements.

All this will happen if Nature's plan is not interfered with. Nutritional elements must be present; vitamin catalysts must assist; a fine endocrine balance must direct utilization and distribution of the chemical elements in bone building; normal function must add its urge to development; and, moreover, the teeth and arches must develop in a balance of atmospheric and internal and external muscle pressures. If any one of these factors fails to click with the rest, Nature's plan miscarries and there is a malocclusion.

The orthodontist is then called in to be a pinch hitter for providence. A pinch hitter for providence! What a thrilling opportunity that offers—but what a responsibility it entails! The orthodontist's function is not merely to push and pull teeth about, but to be the guiding genius of the child's facial, oral

and dental development. Surely, then, it behooves orthodontists not only to study orthodontics, but to try to comprehend Nature's plan; to realize that when they alter or mold anatomy, they must be aware that anatomy exists only as a basis for function. The answer to all this is that teeth must be moved to functional as well as esthetic positions.

We are accustomed to thinking of esthetics as referring to improved facial and dental appearance. The dictionary, which often lags behind current usage, still tells us that esthetics is "the science of the beautiful."

"But," you say, "you can't measure beauty with a yardstick. To develop beauty requires artistic sense, not science."

There are men who have marvelous color sense and a wonderful sense of composition, but who could not possibly paint a picture because they lack the technical training which is the basis upon which painting is built. There are men who can originate wonderful melodies, but could not write a song because they lack knowledge of musical mechanics—of the science of harmony and counterpoint. There are, on the other hand, hack writers who know all about harmony and orchestration, but lack the divine spark which would enable them to create a beautiful melody.

To create beauty, in any form, demands first the science of the beautiful, and then the soul, the vision, of an artist. It is an interesting fact that the most beautiful arm, or leg, or human body assembly is the one best oriented and developed for function. Likewise, the most beautiful dentures are those oriented for efficient and nonpathologic function; the most beautiful tooth alignment is that which provides correct axial alignment, correct interproximal contacts and protection of the gingival tissues. And that beauty must be founded upon a scientific basis.

The dentures must be oriented to the skull in proper relation to the centers of force and of jaw movement. Simon has provided a scientific basis approached from the standpoint of esthetics, in what is now commonly known as gnathostatics. The Frankfort plane is plotted, and perpendiculars are dropped from it at the orbitales; those orbital planes drop through the posterior third of the maxillary cuspids, in European Caucasians. There are racial and individual deviations from this "average" orientation, of which the orthodontist must ever be mindful. Averages can never be more than a starting place in clinical study and treatment. Averages seldom really fit individuals. Take, as an example, the average shoe size of this audience; how many of us could wear the "average" shoes with comfort?

The possibilities of gnathostatics as per Simon, for the evaluation of mandibular development during and after orthodontic treatment, have been convincingly demonstrated by McCoy. Development means beauty; and an evaluation of beauty would be impossible without utilizing some scientific basis for orientation and measurement.

A second, and very simple, means for evaluating denture orientation in the skull has been given us by Atkinson. The zygomatic process is a strong truss, bracing the bones of the face and cranium. Downward from its base extends a buttress which braces the maxillary bone and conducts occlusal force to the

zygomatic arch, distributing its stress equitably to the bones of the face and skull. This sub-zygomatic buttress, or as Atkinson calls it in deference to Angle's "key tooth" terminology, the "key ridge," is present in the edentulous maxillae of infancy and throughout life, to old age. It is uniformly oriented in all races and types, indeed in all mammalia; it remains an unchanged facial landmark throughout life. At three years of age, when the deciduous denture is at the height of its development, the mesiobuccal lobe of the maxillary second deciduous molar stands under this buttress. As the jaw develops and the denture grows forward, the mesiobuccal lobe of the maxillary first permanent molar assumes a position under the sub-zygomatic buttress at the age of eighteen years.

Other gauges of denture orientation are the lip lines used by prosthodontists. The low lip line is that of the lip at rest; the incisal edges of maxillary incisors should be about 2 mm. above it. The high lip line is that assumed by the lip in the patient's broadest smile. The gingival line of the teeth should follow the high lip line.

The final factor of orientation is the median line of the face, if it is not deranged by some extraneous pressure of sleeping or leaning posture, and the median raphe of the hard palate.

The study of functional denture relationships, of occlusal contacts between maxillary and mandibular teeth during masticatory functional movements of the jaw, calls for the orienting of study models having hard teeth, upon a physiologic articulator, so the models may be studied in functional motion. Such a study takes us out of gnathostatics and into gnathodynamics.

Gnathodynamic study models are oriented to the hinge axis of the temporomandibular joints, which is the starting point of all joint movements; and to a modified Frankfort plane, extending from the hinge axis to the floor of the orbit. I doubt if orthodontists will ever mount all their models on articulators; it will not be necessary once the orthodontist has mounted enough models and studied enough cases from the dynamic standpoint to become proficient in the prosthetic phases of orthodontic treatment.

A complete exposition of the factors of gnathodynamic occlusion, of the coordination of maxillary and mandibular cusps to the individual's jaw movements so they will cooperate smoothly and nonantagonistically during the masticatory function, would require a course of lectures rather than an essay. Certain outstanding points may, however, be briefly sketched.

Efficient masticatory function, like all other physiology, is based upon anatomic factors. It depends first upon temporomandibular joint anatomy, which, so far as we know at present, we cannot change clinically. Second, it depends upon jaw anatomy, or, in other words, tooth position; and this is particularly orthodontia's field and responsibility. Third, it depends upon tooth anatomy, which the orthodontist can change slightly by selective spot grinding. This does not mean that it is permissible to move teeth carelessly, and then grind them unreasonably; nothing but disaster could be accomplished in that way. It means that when the utmost has been accomplished by orthodontic treatment, it is logical to reduce the cuspal interference which Endelman so aptly terms "pathologic occlusion," by judicious selective grinding. But selective grinding is not a haphazard procedure; it is a science in itself.

The factors of tooth position which join to produce masticatory function are: arch form, the longitudinal occlusal curve (of Spee), and a lateral occlusal curve for each side of the arch. These curves may be approximately plotted by a technique provided by Frank Wadsworth; it is done upon the models when they are accurately oriented upon a physiologic articulator. Such an occlusal curve survey gives only average curvatures which must be individualized to the patient in hand. In treatment, the longitudinal occlusal curve is obtained orthodontically by uprighting the roots of posterior teeth mesiodistally; the lateral curves are obtained by torqueing teeth buccolingually.

The important thing for the modern orthodontist is to develop a concept of dynamic occlusion—of the dentures in motion; and to study patients' dentures in protrusive and lateral relationships as well as centric, throughout orthodontic treatment. The orthodontist should have as complete a knowledge of occlusion as the prosthodontist, for he is "setting up" teeth in the jaws—a much more difficult matter than setting them up on articulators, in artificial bases. I am not at all unmindful of the difficulty which confronts you; your task is immensely more difficult than that of the prosthodontist. You have, however, two great advantages—you do not have to transfer your treatment operations to the makeshift substitute we call an articulator, and having there developed a coordinated occlusion, place it in the mouth and have it function just as it did on the articulator. You are working *directly* on the only perfect articulator—the patient's own jaws. Furthermore, if you reach a close approximation of coordinated occlusion, and use retaining appliances which permit tooth movement within prescribed limits, masticatory function during retention will induce the teeth to settle into improved occlusal relationships.

Despite this measure of encouragement, your task is a difficult one. I have heard orthodontists say, "It is impossible to do all this with our present appliances." That, however, has never discouraged your specialty. One of your glorious traditions is that the challenge of each new realization of requirements in treatment has always spurred you to the development of better appliances. As a matter of fact, however, your present appliances offer great possibilities for creating functional tooth relationships.

If I have talked to you very plainly, it is not from any sense of exaggerated ego, nor in any mood of criticism. Most of you know me well enough to believe that I have done so because of my intense interest in orthodontics and in all dentistry.

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CRUMBS FROM THE ORTHODONTIC TABLE

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HOW little we know about each other. I remember chatting with the charming young lady assistant of a leading New York orthodontist, a man, who had himself traveled rather extensively, and this young lady seemed rather fascinated, if I may use this word modestly, by my accent, and asked me where I had learned to speak English. Also, knowing that I was an orthodontist, or at least professing to be such, she wondered whether I had any patients down in Australia who appreciated this sort of thing. She seemed to imagine, as do so many, that we Australians belonged to some primitive branch of man's ancestral tree who spent our days in a more or less fruitless endeavor to eke out an existence from an arid and hostile land.

Realizing, nevertheless, our isolation from the cultural benefits of both the old and the new worlds, I set out, may I venture to say, for the second time, and left my arboreal haunts in search of a little knowledge of what other parts of the world were doing, and eventually arrived by a rather roundabout route in the office of this certain leading orthodontist with the ingenuous young lady in question. So perhaps smarting under the suggestion that I had learned English amazingly quickly considering my short stay in America, I feel that I might make so bold as to set down some of my "confessions and impressions" gathered during my wanderings.

Here again, as in a previous article, I feel that I must make it quite clear that there is no personal bias in my comments, for all the orthodontists I visited have contributed in some way or another to the sum total of my impressions; and, while I feel that it is unwise to single out specific individuals for praise or blame, I feel that trends of thought can be sensed from discussion with men, either individually or in groups, and that these trends or tendencies can be quite impersonally recorded. The great kindness and hospitality that it was my good fortune to meet at every place I visited, have created for me a debt quite beyond my ability, individually, to repay, much as I desire the privilege and pleasure of so doing, and so in this brief commentary I shall endeavor in part to repay those interested by recording my impressions concerning some of those phases of orthodontic thought and practice that I feel will be of interest.

Let me comment early in this article on the somewhat cryptic remark made to me by a rather cynical Irishman in the course of a final chat after a week of heavy debate on things orthodontic. He suggested that I was more or less wasting a lot of valuable time in dashing all over the place visiting orthodontists and others interested, and that in the long run I would be so confused by the mass of conflicting ideas and opinions that my mind would be just a blank on most things, and the only definite impression I would carry home would be that of the last man I visited. In an endeavor to avoid this hazy state of mind, I have

purposely waited for quite a long time so that I might get things in a reasonably accurate perspective, and be so far, in point of time, from the scene of my wanderings, that my first and my last visit seemed rather near to one another.

However, he was nearly right, from the point of view of the influence of techniques upon me at any rate, for my last port of call, as far as a group was concerned, was the Pacific coast of California, where, not alone in my own opinion, is practiced the most advanced dentistry of the present day.

It seems to be conceded among men able to compare notes on this question, that nowhere does the technique of dentistry find higher expression than on the west coast of California. Other groups may equal, but none exceed, the men in this region—from the technical aspect—and I do not think it is the climate of which they are so proud that is the cause of their great skill. Perhaps it is a happy combination of the merging of favorable economic conditions, an intelligent and educated laity, and the rich rewards for beauty, what one may call the high finance of pulchritude which finds its expression in Hollywood, that has encouraged and fostered a demand for high grade dentistry and has apparently been so stimulating to dentists in that region.

However, so that we may at least attempt correct perspective in relation to such observations as I have the temerity to record, let us commence by examining some present trends in orthodontic education.

ORTHODONTIC TEACHING

I believe that in any review of orthodontic thought or practice our purpose can best be served by an examination of what the student is taught as an undergraduate or acquires later in postgraduate study, for the practitioner's knowledge will be largely based on the concepts that he gains or that are impressed upon him during his academic years.

With this idea in mind I made it my business in as many places as possible to study the undergraduate orthodontic clinics, and the postgraduate departments where they existed, so that I might better understand what their contemporaries in the everyday field of practice were doing. I must confess that my investigations in this direction were for the most part disappointing. Of course this must be related to the fact that in my visiting I had definitely sought out men who were leaders in this sphere, whose ideas and methods of practice were well above their fellows, and, hence, coming upon the more novitiate type of practice as one would find, particularly in undergraduate teaching departments, I would rather, naturally, find that these departments and their students would suffer by comparison with these aforesaid "leaders."

However, I endeavored at all times to be charitably disposed in these circumstances, but nevertheless there were very many occasions when I found undergraduate clinics so backward, so badly organized (although in many cases very well equipped), and so unproductive of result that I could scarcely remain even politely interested. Even, in some cases, was I too disgusted to stay more than a few minutes.

Why is this state of affairs so? Very many of the men in charge of these departments did excellent work in private practice and were really interested and earnest in their endeavors to teach students simple orthodontic procedure,

but in only a very few departments that I visited was there, to my mind, any successful organization, successful teaching, or successful operation. I do not think that the students themselves are to be blamed, nor perhaps are the teachers. I realize that for the most part, orthodontia is still the *bête noir* of dental students, but why it should remain so in these days of advanced technique in so many other departments, and in the face of orthodontic advance, seems to beggar solution, unless it is by reason of a bogey in relation to orthodontics that has become traditional among dental students.

It is not my intention here to debate the much discussed question of orthodontic teaching as an integral part of a dental course or as an entirely separate entity; all I wish to record is that my observations are so, and that as this subject is still taught in the dental course, as either an obligatory or an optional subject, I feel that a study of the results of the present system would be interesting and perhaps serve as a basis for criticism, and perhaps reorganization.

When I say that I have seen clinics in which all that had been accomplished for a patient in one academic year was the placing of four molar bands, and when I say that in most teaching clinics that one may visit anywhere, it is difficult to find a successfully treated case, and when I say that in some clinics professing to teach preventive orthodontia I found that the average age of patients was well above twelve years and that they presented the most complicated types of malocclusion, surely it will suggest that there is something wrong somewhere.

I am compelled to say that I saw very few undergraduate clinics that might be called reasonably successful, and that was where there was a definite selection of cases either for demonstration or for student practice, and that the men in charge had the wisdom and experience (and the free hand) to select their patients carefully, and were not compelled to accept cases haphazard without regard to the difficulty of the case or their students' ability to handle them.

In many cases I came to feel that the orthodontic department was servile to authorities who should not have had authority over it. This matter of course is difficult to debate, but it is obvious to me, from my observations, that in many cases those in control had little sympathy with or understanding of the needs of the orthodontic department and the students therein, and only looked upon it as a department to be administered. Thus it often happens (all over the world) that some one, usually in an administrative capacity, runs the orthodontic department, and the teacher, with the specialized knowledge, is subservient to some one who has little or no knowledge of orthodontic practice or requirements.

The amount of what I call interference, that I found in orthodontic departments, amazed me. Too often these departments are run merely as clinics, and while admitting that, particularly in some countries, they have an obligation to treat sufferers from malocclusion, from either a civic or a national responsibility, I feel that these cases must be considered separately in a special clinic for that purpose, competently staffed, and not used to flood the teaching department and embarrass teachers who have not the time, or students who have not the ability, to treat the varied and complex types of cases that present under these circumstances.

ANOTHER ASPECT OF INTERFERENCE

Many times have I stood, I hope in the background, and listened to the advice and instructions that have been given to students standing round an orthodontic "case." From that vantage point I have learned a great deal, sometimes to my horror, in hearing the sort of thing that "knowledgeable" dentists "on the staff" (particularly in Great Britain) pour into the students' ears and whose opinions are thus so early moulded by men, perhaps with great reputations in general practice, but with very little knowledge of orthodontics. I admit that the narrowing influence of the specialist needs many times to be countered by the broadening influence of the general practitioner, but I feel that a general practitioner should never be allowed to impress upon students his views on a special subject of which he can have but little more than a superficial knowledge. Of course, it must be realized that this criticized general practitioner is talking with students, who for the most part, will be general practitioners, and that it is useless trying to give them the concept of specialists, but nevertheless surely it is reasonable that, with the more thorough understanding of orthodontia's basic principles that a "specialist" can give to the students, they have a better basis from which to reason than from the basis of "eternal compromise," "wait and see," and "let nature take its course," that unhappily one so often finds with the general practitioner.

THE QUESTION OF EXTRACTION

I think it may be conceded that the matter of extraction of teeth still offers one of the most fruitful sources of debate in orthodontics today. Whether one is a hidebound conservative or the most rabid exponent of "simple treatment for the masses," one cannot fail to find strong support or equally vigorous opposition to any view one holds. I feel that I have met a goodly proportion of the "common sense" men, the "idealists" and the "extractors," and find that the rational view still depends upon the concepts, the ideals, and, most important of all, the skill and conscientiousness of the individual. I think it may be fairly said that the willingness to remove teeth depends more on the lack of skill and technical equipment of the operator than on any "scientific" judgment of the merits of the case under review. This may seem a little unfair to those who feel that when they extract they do so on scientific grounds.

I extract myself—at times—but in the light of my experience and observations I still feel that it is a compromise—on whatever grounds it may be, when I advocate this course. It is a compromise because (unless for such reasons as complete breakdown of tooth structure, absence of teeth and so forth) when one extracts, one does so because of inability to do something which we know on basic principles should be done. This applies in cases of bimaxillary prognathism, where one feels one is unable to resolve the forward tooth mass to its proper relation with the skull. To attempt distal movement with retention of all teeth in these cases when one knows that the ultimate result would be failure or even increased prognathism, is definitely bad treatment and the result

of a bias based on a false idealism. But extraction in these cases is a compromise nevertheless, and an admission that we cannot do what we would like to be able to do.

I must confess that I have waged much wordy warfare in discussion of this point, and have allowed myself very many times to be considered a "compromiser" so that I might test the logic of those who claim conservative treatment at all costs and in spite of everything. It is admitted (and I myself hold to the view) that student and postgraduate teaching must be based on ideals, and the only unchallengeable ideal here is the principle of normal occlusion.

The student must be given something to hang on to; if there is no ideal for him to work to, his normal soon becomes an average, as we see so often in the literature where we find the philologists seeking to explain "normal" in such terms. But they do not explain it so much as they excuse their inability to attain what should be their goal in every case—the ideal normal.

CONCERNING GNATHOSTATICS

Here again we come to a point of view. The excitement over this new found principle seems to have subsided somewhat after the usual storm of controversy that any new principle arouses, and I feel that it has left the conviction that something of value has been added to orthodontic practice. Here again, we find the question of theory versus practice, and apart from considerations of whether it offers a rational means of diagnosis or merely a useful guide, or whether it is quite unreliable because of the inconstancy of the landmarks chosen, one is forced to the conclusion that techniques are again the dominant consideration. It matters little, except as a spur to further efforts, if a man can diagnose an anomaly to be such and such if he cannot resolve that anomaly to a normal condition. Our technical equipment must be in line with our diagnostic equipment if it is to be of real value, but as far as our present knowledge allows, I still feel that the surest guides to diagnosis are a deep understanding of normal occlusion, an accurate knowledge of dentofacial development, a wide experience of human facial types, and a keen esthetic appreciation of physical beauty.

ORTHODONTIC MATERIALS

Now that the depression is over(?), perhaps the steel versus gold controversy will hinge upon the merits and demerits of the respective metals, apart from their economic value. *Time* is the most important element in orthodontic technique, and by that I mean both the time of manipulation and the *treatment time* that the virtues and properties of the metal allow, and one's choice of material should be based on these considerations rather than on the mere cost of the material, which is quite negligible against its manipulation time, and what speed and efficiency can be gained from its use. Naturally, the choice of metal will depend on the use which it is designed to serve, and its stability in the form that it is used.

I believe that the problems of union of steels has been quite satisfactorily solved, although of course present methods will continue to be improved upon,

but until they offer a superior time factor in every regard, they cannot be considered to have supplanted gold alloys.

From my observations of the uses and merits of the metals in question, and although possessing a satisfactory welding machine and steel soldering equipment, I prefer to use these metals in combination, still favoring gold alloy bands because they are more easily worked and brackets can be more easily and neatly adjusted to them, and I use steel arches where no unions are required. When unions are required, I immediately revert to gold arches because the unions can be made more neatly, wrapping and reenforcing are not needed, and the arch strength can be more uniformly maintained.

This routine has been developed after seeing most of the outstanding orthodontists who work with steel and comparing their techniques and results with those who work with the gold alloys. Each have their merits, and so it seemed obvious to me to develop a technique that would employ gold alloy where it is most advantageous and steel where its intrinsic qualities are superior. The manner of application of this principle would naturally depend on one's own technique, and need not, I believe, be gone into here.

FIXED AND REMOVABLE APPLIANCES

It is not my intention here to enter into any controversy over the merits and demerits of fixed and removable appliances, for there would be too many points to cover were I to attempt, even in the briefest manner, any discussion relative to these two distinct types of appliances. I feel that the main comment of interest will be that, by and large, those who work with removable appliances, be they plates, cribs, or labial or lingual appliances anchored to bands cemented on the teeth, seem in general to take longer in the treatment of their cases than those who use fixed appliances.

Now I do not consider that this in itself is a matter of great moment—it is the result and the stability of that result that counts, but it does seem to me that the fixed technique offers benefits in regard to the time factor (more particularly the patient's time) that give it an advantage over the removable type of appliance.

Here it would seem that criticism will be leveled at my comment on the grounds that I, being trained with fixed appliances, have a bias in that direction, and perhaps this is somewhat true. However, I do not make this comment merely from observation alone, although that is the most valuable field for comment. I have purposely experimented with fixed and removable appliances with my own patients, and have been at some pains to remove myself from the novitiate class in regard to the handling of a technique that was strange to me, for I make these comments nearly two years after my examination of the techniques in question, and I have worked with most of those removable or partly removable techniques that impressed me (and some did certainly impress me), and I have proved to my own satisfaction that, in my hands at any rate, fixed appliances give the speediest and most satisfactory result.

At the risk of laboring the subject, I wish to make this point quite clear. I have purposely selected cases in which the lingual removable appliance seemed

most suitable, and have applied stimulation of the controlled type, and have gained what would be considered a favorable response by those men who work with this type of appliance; but I have in very many cases, after a short time, changed to a fixed labial appliance and finished the case in less than half the time that the lingual appliance would have taken.

It is not the time element alone that leads me still to favor fixed labial appliances (in contrast to lingual appliances). I feel that the fixed labial appliance is much safer on general grounds than a lingual appliance, for the simple reason that it offers greater control.

However, I feel I must stop with this comment, for I do not want to start an argument; and this is just my own honest opinion, gathered from what I have seen, and clinical experiments that I have made to satisfy myself about this matter.

QUESTION OF CASE REPORTS

Although happily the literature shows signs that essayists are realizing that it is not fitting any more to illustrate their work with "before and after" models, an examination of the average model cabinet of orthodontists, and discussion with them shows that very rarely are cases followed to the logical conclusion and examined or reported years after treatment to show the actual stability of the result. Still too often does one note the tendency to demonstrate a treated case very shortly after removal of appliances. Of course many of the older men who have been practicing for several decades have the opportunity to study the ultimate success of their cases and thereby have, for the most part, developed or acquired a seemly modesty about the success of their efforts in treatment, and their work and their influence in this regard must eventually cause the younger generation of orthodontists who, by virtue of the rapid growth of the profession, are in the great majority, to be more cautious or discreet in displaying their results "after treatment." As suggested, this trend of caution is appearing in the literature, but in actual fact, I think it is safe to say, most orthodontists (particularly of the younger group) are prone to demonstrate before societies their skill on the lines of "before and after" treatment. Discerning dentists realize that the stability of the treated case can be determined only years after treatment, and any one who does not recognize this fact is liable to be accused of showmanship and must eventually damage his prestige and also the status of orthodontics itself.

Of course there also must be admitted the tendency of some men to show methods and be very vague about the results. This to my mind is just as unfavorable as the other tendency, for there were offices that I visited, in which on asking to see finished models of treated cases, I was informed that they did not have these in very many cases, as the patients seemed, I gathered, just to fade away; treatment apparently being so protracted or economic conditions such that the patients either lost interest or were unable, for various reasons, to continue their visits. This is just as damaging to the status and the public appreciation of orthodontics as anything could be, but I regret to assure readers that I saw evidence of this, and this naturally colored my impression of the technique that was employed in these cases.

PRIDE AND PREJUDICE

People like to see results, and usually know nothing of the merits or demerits of various techniques. Their opinions and prejudices, and there are very many prejudices, are influenced largely by their environment or the personality and persuasive powers of their dentist or orthodontist. I have stood in German orthodontic offices and seen patient and operator roar with laughter at the appliance that a visiting patient was wearing, because it was so far removed from their conception of what a good orthodontic appliance should be. This appliance in question was a standard American fixed appliance, and quite a good one at that. Again, I remember talking to a group of excellent fellows who entertained me at lunch in one of the larger American cities, and they were almost hysterical over a box of appliances (steel), which I carried with me, and that were fashioned with great dexterity by some of the most skillful fingers in Germany and Great Britain. It is all according to the point of view.

As I said, people like to see results, and while the average fond parent would like an appliance to be invisible, or at least hardly noticeable, in this enlightened age they usually like to feel that they are getting somewhere. As a rule, once started, and their earlier fears of failure of treatment having been allayed, they are confident in their orthodontist's ability to give them a result that will last, but if treatment is inordinately slow, or even static, they tend to get restless after the lapse of years, unless their orthodontist has extraordinary powers of conviction in regard to the wisdom of biologic treatment.

I believe that most of us have, with varying degrees of emphasis and satisfaction, nursed the illusion that "our" treatment is biologic and the other fellow's is not. I have seen this so often, and entirely apart from personalities, one must remember the great offensives that have been launched by two great American schools of orthodontic thought, in regard to the biologic propensities of their own technique, and the unbiologic attributes of their opponents' technique. It is remarkable to see both sides using the same ammunition, for when it comes to the question of tissue reaction from the particular type of stimulation that their appliances afford, they both quote Oppenheim to prove their case. It is really quite laughable were it not rather pathetic, for it only illustrates again the vicious effect of prejudice, supporting one's own ideas and condemning those of the other man.

If we were honest with ourselves, we would admit, as Oppenheim has recently pointed out (in his last researches), that there is no such thing as biologic treatment. Naturally, we try our best to make our treatment accord with biologic principles, which principles have been laid down quite definitely in the literature for some time, but to call *any* "mechanical" therapy biologic is merely a contradiction; biologic treatment does not exist.

THE QUESTION OF PROPHYLAXIS

Here again is a matter that touches the general welfare of orthodontic practice and influences its worth as a health service (or an esthetic service) as far as the public is concerned.

No orthodontic appliance is self-cleansing, and it must be conceded that no matter what type, an orthodontic appliance makes mouth sanitation more

difficult for the wearer. Regardless of one's opinion as to the root cause of dental caries, one must admit that food debris around the teeth and gingivae is detrimental to dental and oral health, and the ability of the orthodontic patient to clean his appliance and the success of the orthodontist in maintaining a discipline in regard to dental prophylaxis will determine the success or otherwise of mouth sanitation during orthodontic treatment, and will in turn, apart from the result gained, decide the patient, the parents, the relatives and the public at large, whether orthodontic treatment has been successful or whether it has had a deleterious effect on the teeth and the oral tissues.

I believe that more harm has been done in the past by breakdown of teeth during orthodontic treatment than has been done by lack of "perfect result." The public, generally, has not such a standard of values as to criticize the result in terms of normal ideal occlusion. Usually, any improvement, particularly if lasting, was hailed with delight, but if treatment resulted in, or was accompanied by, any great degree of caries, orthodontia was brought into disrepute in the mind of the patient, the parents, the relatives and eventually the public. Of course it must be admitted that any cavity or any tissue breakdown occurring during or at any time after orthodontic treatment, is still, naturally, in the public's eye, the fault of orthodontic technique. It will be a long time yet before this prejudice, based we must admit, very largely on fact, is overcome. The problem is, how best to counteract any tendency to caries during treatment, and how best to maintain the highest possible standard of oral hygiene in the patient. In those states in which oral hygienists exist, the question is largely solved, and where they do not, it seems largely a question of the personality of the orthodontist impressing this need upon the patient and parents.

Many times have I watched orthodontists using up valuable time in cleaning mouths that should not have needed such service from him, and the need of the patients for greater appreciation of oral hygiene—in their own interests—was continually impressed upon me as something that was necessary (in most countries) for an increased appreciation of the value of orthodontics as a health service.

So, having gathered a few stray crumbs from the orthodontic table, I conclude this brief discourse with the fervent hope that my comments, some of which may seem unduly critical, will not harden men against receiving stray visitors with the kindness that I met, and will not cause them to become less frank than I was happy to find them. I know that very many times a visitor, particularly if he dropped in as unexpectedly as I did on many occasions, is a definite nuisance in a busy practice, and it speaks volumes for the kindness and patience of orthodontists generally that they, almost without exception, found time and opportunity to discuss, to demonstrate, introduce to patients and generally explain anything in their power to such a stray person as myself, who wandered around, searching, like Diogenes, for the truth.

MEETING THE PROBLEM CREATED BY THE CONGENITAL ABSENCE OF MAXILLARY LATERAL INCISORS

JOHN RUSH MCCOY, D.D.S., LOS ANGELES, CALIF.

THE title of this report indicates definitely the problem involved. In the case to be reported, we know that this anomaly may be met in two ways; viz., by closing the spaces occasioned by the absent teeth through the movement of such other teeth as are necessary to compensate for the lost tooth substance, or by opening up the spaces fully and replacing the absent teeth by artificial means. The first plan of treatment was employed, and because of the satisfactory end-results obtained, and the technique employed in the use of orthodontic mechanism, it was deemed suitable for this occasion.

History.—The patient, a girl fifteen years of age, was brought to me for treatment in April, 1933. Parental history was not complete because the father was not living, but the teeth and jaws of the mother were within the range of the normal. The patient's oral tissues were healthy, the incidence of caries was mild, and all the teeth were vital. The tongue was normal in size, the tonsils were free from pathologic involvement, the nose and lips in function, and the habit of breathing normal. Facial muscles were normal in tone, and the child generally presented every evidence of good health. Roentgenograms substantiated the clinical observation that the maxillary lateral incisors were absent.

Attributed Etiology.—The congenital absence of the maxillary lateral incisors could be explained upon no other ground than that of heredity, but in view of the incomplete family history, this was but assumed.

Diagnosis.—Photostatic facial and gnathostatic denture reproductions (in addition to roentgenograms) were utilized to record the case and served to confirm the conclusion that the anomaly was eugnathic in character, the denture alone being involved. As previously inferred, it was deemed expedient to use the canine teeth as substitutes for the absent lateral incisors, the first bicuspids for the canines, and shift the remaining posterior maxillary teeth in a manner to complete this compensating alteration.

Treatment Therapy Employed.—Fig. 1 *A* shows a diagrammatic drawing of the maxillary arch with appliances in position. The molar bands carried short welded buccal tubes to receive a plain round arch wire, 0.030 inch in diameter. The central incisors and canines were banded and open tube attachments welded thereon, with the rotating arm in each instance extending distally. The arch wire was adapted in a passive state, being made to lie in

Case report presented at Thirty-Fifth Annual Meeting of American Society of Orthodontists, Chicago, April, 1937.

close proximity to all of the teeth. Fig. 1 *B* shows the occlusal view. In starting tooth movement, a contractile silk ligature was first tied across the central incisors, engaging the extending rotating arms of the open tube attach-

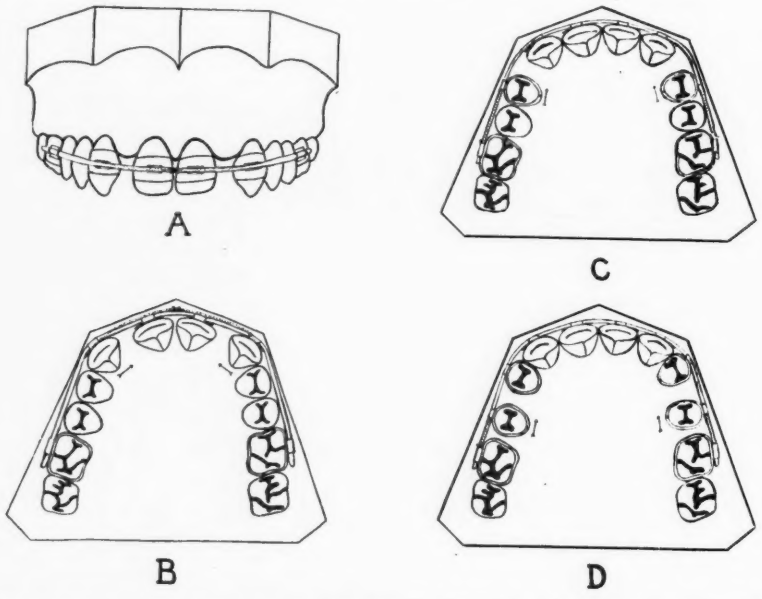


Fig. 1.—Diagrammatic drawings showing appliances upon the maxillary teeth, and a sequence of tooth movements during treatment.

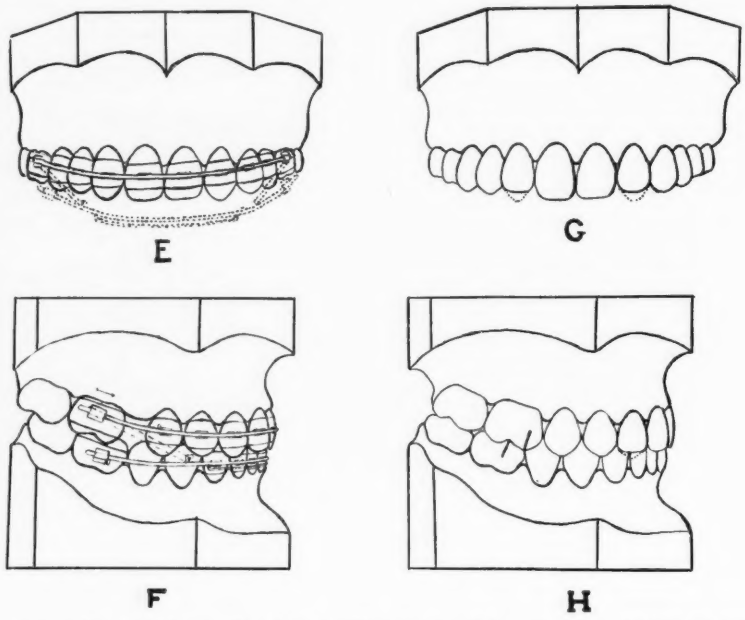


Fig. 2.—Diagrammatic drawings, showing appliances used for the completion of primary treatment, and also the relations of the teeth when this status had been accomplished.

ments. In this manner the central incisors were promptly moved into apposition. The arch wire was then removed and short vertical pins were soldered at points which would hold them in their new positions. The arrow in *B* shows the direction of the first movement. Contractile silk ligatures were then ex-

tended to each cuspid, and they were brought in contact with the central incisors, as shown in *C*. Short vertical pins were then added to the arch wire to hold them in this relationship. Bands were then made for the first bicuspids and open tube attachments placed thereon. An 0.020 lug, or vertical pin, was then soldered on the arch wire just mesial to the molar buccal tubes on each

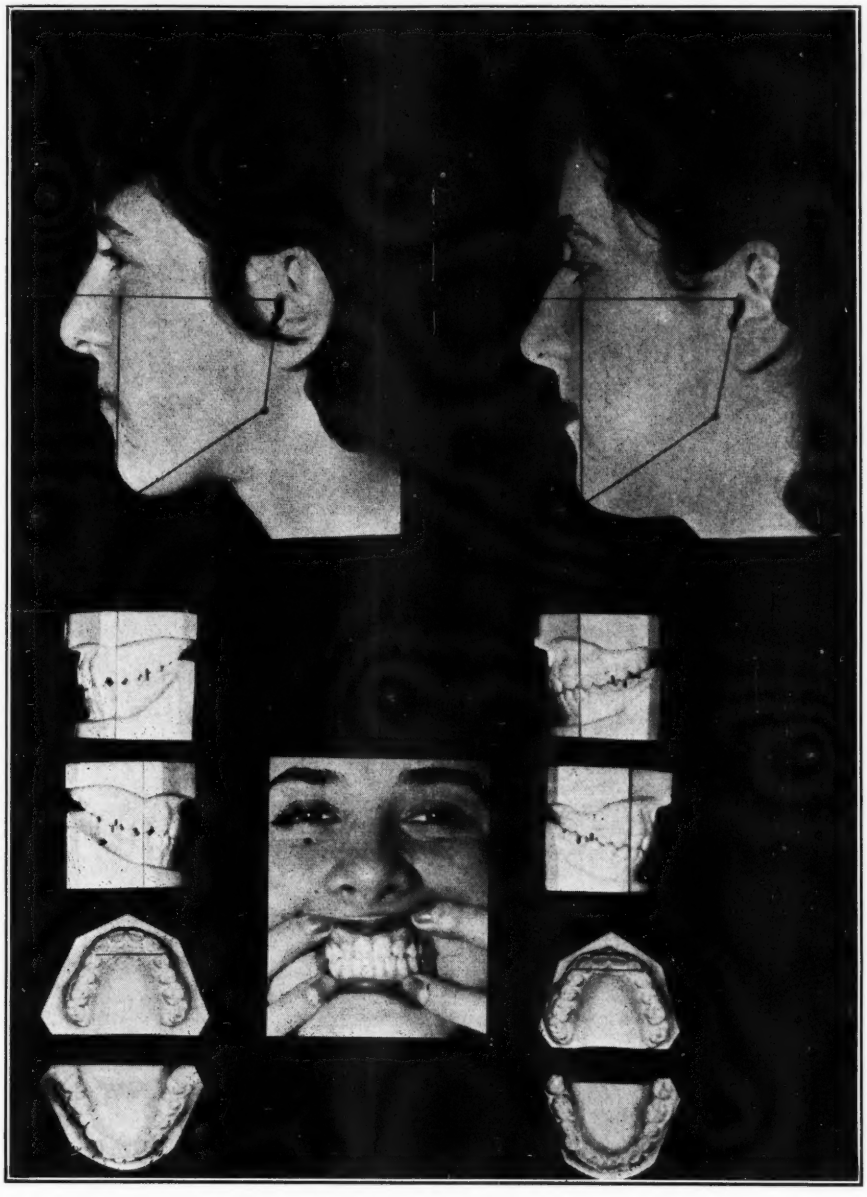


Fig. 3.—Photograph and gnathostatic records of the patient, a girl fifteen years of age.

side, and a coil spring, 0.030 inch in diameter, was turned through this lug to occupy, in a compressed manner, the space between the posterior aspect of the open tube on the first bicuspid and the lug on the arch wire, as shown in *C*. The arrow shows the direction of the pressure produced. When the first bicuspids were in contact with the canines, they were sustained in position

with short vertical pins, in the same manner as employed by the teeth previously moved, and the same procedure was followed with the second bicuspid as with the first, *all the teeth being moved along the arch wire without being tipped.*

Attention was next directed to the forward movement of the molars, as shown in Fig. 2 *E*. The application of intermaxillary pressure was put in effect

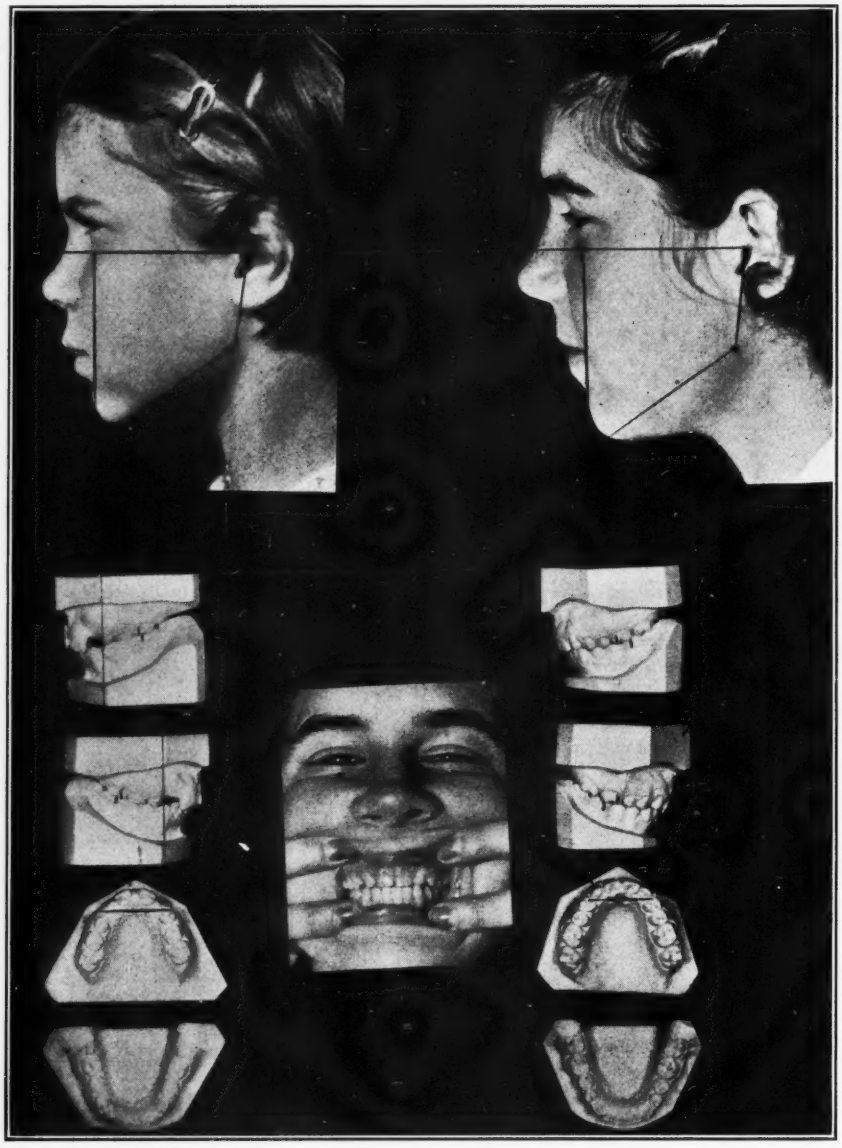


Fig. 4.—Photostatic and gnathostatic records of a patient, a girl thirteen years of age.

here, after removing the lugs just anterior to the buccal tubings which previously had served to support the coil springs. *F* shows force being applied, and the arrow, the direction of movement. The mandibular anchorage consisted of molar bands carrying short welded buccal tubes to receive an 0.030 arch wire, six anterior teeth banded with open tube attachments welded thereto, and a plain labial

arch wire. To give stable anchorage, and prevent any chance of tipping the incisors, an 0.020 extension is shown running from the posterior aspect of the open tube on each cuspid. This wire, adapted gingivally and parallel to the main arch, becomes a twin arch in this section and contacts the six anterior teeth.

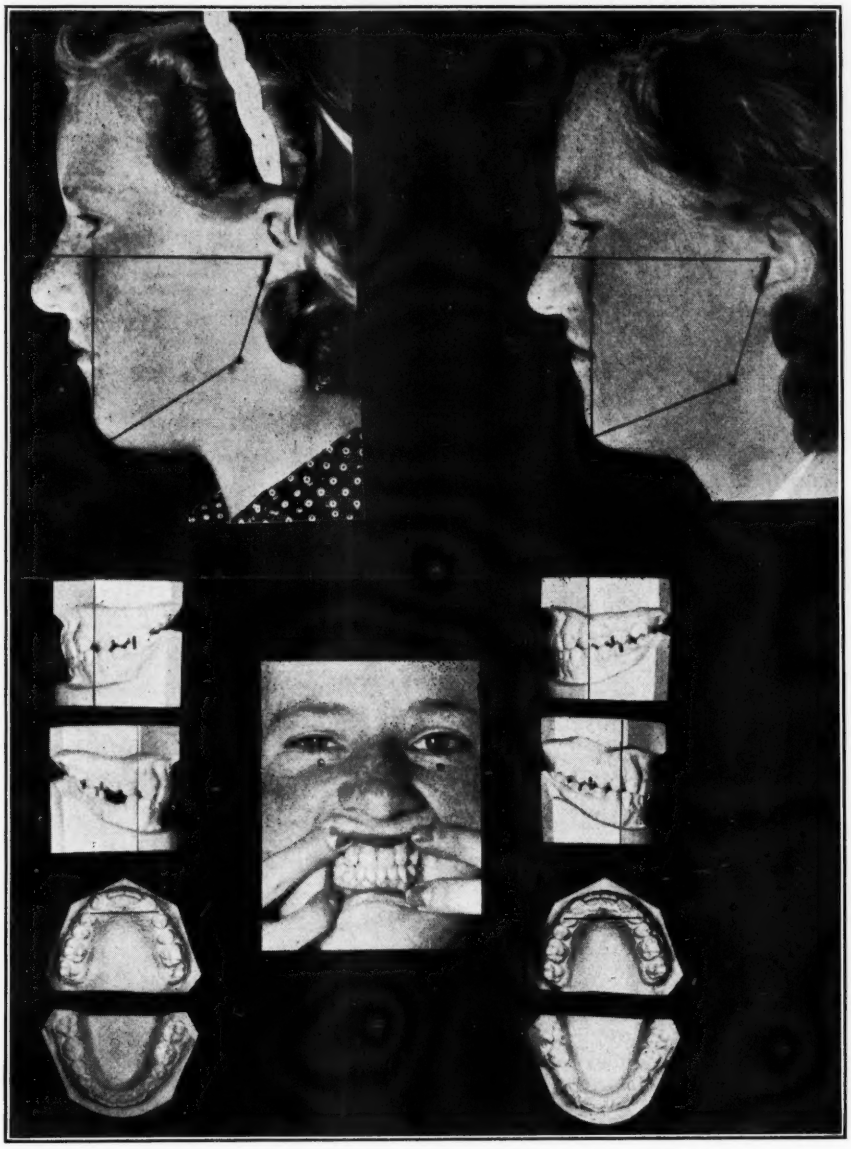


Fig. 5.—Photostatic and gnathostatic records of a patient, a girl fourteen years of age.

Results Achieved.—*G* and *H* show diagrammatically the results achieved. In *G* we see where the points of the canines have been carefully ground off (shown by dotted lines) so that the teeth assume the form of lateral incisors. *H* also shows this, as well as the new cuspal relationship of all teeth. Primary treatment was completed in August, 1934, when Hawley retainers were placed on both maxillary and mandibular arches.

Prognosis.—Prognosis for a favorable esthetic and functional result was judged logical at the time primary treatment was completed and has been justified by subsequent developments.

Observations.—Fig. 3 shows photostatic and gnathostatic reproductions made in April, 1933, and in December, 1934, and also a dentofacial photograph taken in April, 1937. This shows the relationship of the teeth and their related structures. Only a trained eye can realize that the maxillary lateral incisors are absent. The complete change in cuspal relationship is shown by the denture reproductions taken before and after treatment. (Note the markings on the molars.) It may also be noted that the facial expression has suffered no detrimental change, but on the contrary is appreciably improved.

Conclusion.—It would seem that any therapy which can accomplish satisfactory results, and at the same time save the patient the necessity of wearing bridges or other artificial dental substitutes, is the logical one to follow. In furtherance of this conclusion, two additional cases of similar nature are shown. In each of these the same plan of treatment as that already described was followed.

In Fig. 4 (A.S.) a girl thirteen years of age is shown. The first denture and facial reproductions were made in February, 1934, the next in September, 1935. The dentofacial insert was made in April, 1937. This case was complicated by fractured central incisors resulting from an automobile accident, the incisal third of these teeth being destroyed.

The other case is shown in Fig. 5 (M.W.), and is a girl fourteen years of age. The first denture and facial records were made in July, 1934, and the second, as well as the dentofacial insert, in April, 1937.

In presenting this report, it might be inferred, from the uniformity of treatment measures employed, that I assume all cases having congenitally absent maxillary incisors should be handled in this manner, but this is not necessarily my opinion. I do feel that many cases *should be handled in this way.* If other complicating anomalies are also present, these should be subjected to careful diagnostic analysis before a definite treatment procedure is decided upon, which in some instances might be quite different from the plan outlined.

CASE REPORT

WILLIS H. GRINNELL, D.M.D., BOSTON, MASS.

CLASS I case, a boy aged seven years, good physical development, no tonsils or adenoids, overlapping maxillary central incisors and lack of space for lateral incisors to erupt. The mandible also was constricted in the anterior section. Maxillary molar bands and lingual arch wire were placed in the boy's mouth on December 19, 1933. Finger springs were to be added to the appliance at the next visit.

On December 21, the boy, while running up the stairs, tripped and fell, striking the edge of the stair tread. The maxillary central incisors were knocked out of the mouth, his lip was cut and face bruised. The mother picked up the teeth from the floor and took them with the boy to the dentist, arriving at his office about an hour after the accident. The dentist placed the teeth in hexylresorcinol solution, swabbed out the sockets and replaced the teeth in the sockets and wired them to the lingual arch. I saw the boy December 26, five days after the accident. At that time, I told the mother that the teeth would probably abscess and would have to be removed, but as the teeth were not showing any signs of infection, I left them alone. The teeth were not discolored, were fairly firm and not very sore. There were no signs of pus or infection.

The patient was kept under close observation, and x-ray pictures were taken at intervals. The teeth continued to keep their normal appearance; there was no discoloration and no signs of infection; and the teeth were not tender to pressure or tapping. Vitality tests with electric tester (two prong type) were made in July, 1936. The central incisors tested two points higher than the lateral incisors (14 for the central incisors and 12 for the lateral incisors).

I wish to read the case report of Dr. Strenge and also a letter from the boy's mother.

Copy of letter from patient's mother, dated October 20, 1936.

Dear Dr. Grinnell:

In reply to your letter, I will try to give you the necessary facts concerning D's accident.

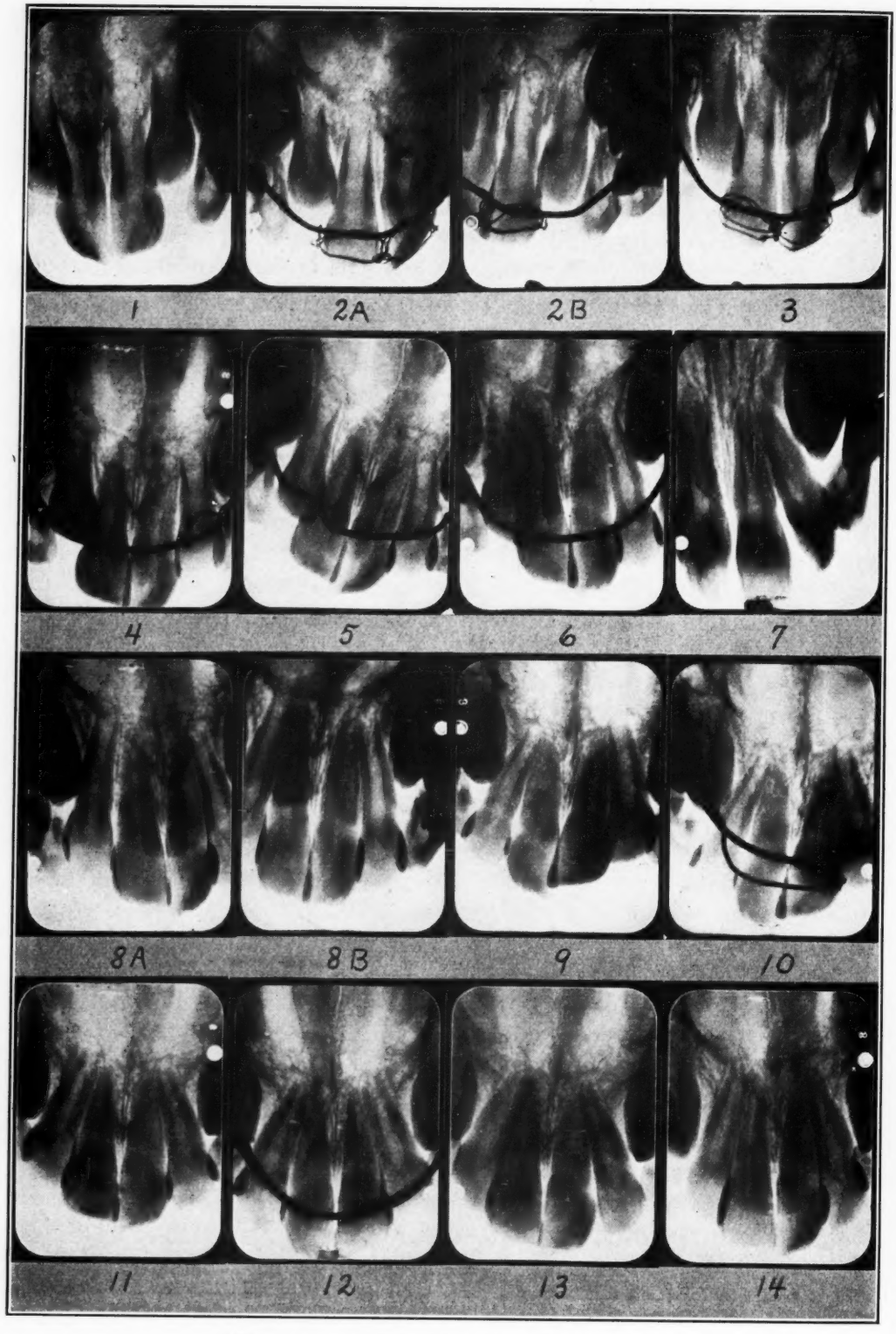
While running up stairs, he slipped and fell, striking his mouth on the edge of the stair. Both of his front teeth were knocked out, his lip cut and his face badly bruised.

It was quite a little time before I could make arrangements to get him to Dr. Strenge's office. Before leaving I had to hunt for one of the teeth. So it was an hour or so before we reached Dr. Strenge's office.

I hope I have given you the necessary information for completing your record.

Yours truly,
(Signed) Mrs. S.

Read before the New York Society of Orthodontists, New York, N. Y., Nov. 24, 1936.



Figs. 1-14.—(See opposite page for legends.)

DR. STRENGE'S CASE REPORT

History.—Mother of patient phoned at 5:30 P.M. December 21, 1933. Child had fallen down stairs and knocked out two upper front teeth. Advised placing teeth in clean napkin and rush youngster to office. Arrived at 6 P.M. (less than one hour after accident).

Clinical Examination.—Patient very nervous. Bleeding from mouth and nose. Two upper centrals missing. Orthodontia appliance in place with bar running from right to left six year molars palatal side of teeth.

Treatment.—Teeth dipped in grain alcohol and then submerged in warm S.T.37 solution for one-half hour. Sockets irrigated with warm S.T.37 to remove blood clots; when reduced to slight bleeding, teeth replanted in sockets, being held in place with cotton rolls under hand pressure for short time, then wired the two centrals together and attached them to orthodontia bar.

Prognosis.—Unfavorable for permanent retention.

(Signed) Arthur L. Strenge.

Notice particularly in the illustrations the change in the roots, that the upper third of the root has continued to develop, and the funnel-shaped root canal has closed.

45 BAY STATE ROAD.

DISCUSSION

Dr. Kelsey.—Have you made tests for vitality? Of course I see they are vital teeth.

Dr. Grinnell.—I did in July with the electric two prong type. The central incisors, being larger, tested 14, and the lateral incisors tested 12. Then I tested the mandibular central incisors, which tested 6, and the mandibular lateral incisors, which tested 8, the same variation.

Dr. Ashley Easterbrook Howes.—Were those teeth mechanically cleaned in any way except placed in the hexylresorcinol solution? Were they scraped or wiped off?

Dr. Grinnell.—Wiped them off with grain alcohol and then put them in warm S.T. 37 solution for one-half hour.

Dr. Howes.—With no scrapings of any kind?

Dr. Grinnell.—No.

Dr. Kelsey.—What is your conclusion? I have made mine. I think they are vital teeth.

Fig. 1.—Taken for routine examination before starting orthodontic case.

Fig. 2.—December 26, 1933, five days after accident. *A*, Right central incisor; *B*, left central incisor.

Fig. 3.—January 16, 1934, twenty-one days after accident

Fig. 4.—July 9, 1934, seven months after accident.

Fig. 5.—August 26, 1934, eight months after accident.

Fig. 6.—January 28, 1935, thirteen months after accident.

Fig. 7.—April 9, 1935, sixteen months after accident.

Fig. 8.—May 27, 1935, seventeen months after accident. *A*, Right central incisor; *B*, left central incisor.

Fig. 9.—June 17, 1935, eighteen months after accident.

Fig. 10.—August 28, 1935, twenty months after accident.

Fig. 11.—December 3, 1935, approximately two years after accident.

Fig. 12.—February 17, 1936, two years and two months after accident.

Fig. 13.—April 21, 1936, two years and four months after accident.

Fig. 14.—June 23, 1936, two and a half years after accident.

Dr. Grinnell.—They are vital teeth. I am firmly convinced that they are vital.

Dr. Kelsey.—This reminds me so forcibly of a little contention or controversy that arose several years ago when a man reported just casually that a polo player had lost an incisor tooth on the polo field and had come to him for treatment, which consisted of his sending out for the tooth, which was found, and then replanting it, accompanied by the assertion that this tooth was vital and had remained in this man's mouth for many years afterward as a vital tooth. He had no evidence such as the splendid evidence that Dr. Grinnell has given. We ridiculed him and laughed at him, and none of us believed it was alive. This presentation brought that case so forcibly to my mind that I could not help commenting on it. I think this is the first case of the traumatic loss of teeth where they are actually out of the alveolar tissues that I have seen reported in which the evidence was adequate to show that a reunion of tissue took place and vitality was maintained. I have heard of these cases, but I had not seen any. I have had cases in which they were all loosened from a croquet mallet accident and remained vital, but this is the first case I have seen of the kind, and I am certainly very glad to have had this evidence presented.

Dr. Sidney E. Riesner.—The case report of Dr. Grinnell's was so interesting, especially from the radiographic evidence that he presented to support his contention, that I should like to emphasize perhaps some of the points that appeal to me that might sharpen your perception in considering similar instances in your own practice.

First of all there was the very significant fact that the state of development of the tooth presented a wide funnel-shaped opening. That means there was a predominance of the genetic form of pulp structure, which predisposed it perhaps a little sooner to the possibility of regeneration, if there were that possibility at all.

Second, his x-ray pictures showed very nicely, if you noticed it, that if you were to consider the 180 degree arc around that apex, at around 40 degrees lateral on either side of those central incisors there was a definite nutrient canal. That appeared quite noticeable there. The fact that these teeth went on to a seeming closure, to a regeneration or a stimulation of the odontoblastic cells which line that pulp chamber and closed the mesiodistal diameter considerably, was an indication perhaps that the predisposing fact of the wide funnel-shaped opening permitted this thing to occur. Therefore, we might draw the conclusion that in cases in which there is a complete loss of the tooth out of the socket the chances perhaps of regeneration occurring are more likely where the tooth presents a wider funnel-shaped opening for attachment.

Dr. Nicolai.—I should like to ask Dr. Grinnell a question. Just what was the occlusion, let us say overbite and overjet, in that particular case; in other words, did the patient have to bite on those teeth?

Dr. Grinnell.—I might say in answer to that, where they were in that position (indicating crossed with the fingers), overlapping, his mandibular central incisors, certainly, did contact the distal corners which turned toward the center of the mouth.

Dr. I. B. Stilson.—It would appear from the x-ray pictures that the root development was much more rapid in those two central incisors than it was in the two lateral incisors. I wonder if anybody could give us a reason for that.

Dr. Kelsey.—They normally do.

Dr. Stilson.—As rapidly as that within a matter of six months? That is more rapid than normal I think.

Dr. Kelsey.—It would appear to be very rapid anyway.

President Barber.—Dr. Grinnell, would you like to say something more?

Dr. Grinnell.—I want first thank Dr. Kelsey and Dr. Riesner and others for their comments. I took these slides over to the Tuft's faculty, and they did not tell me any more

over there than I already knew except to say that it was almost unbelievable. That was my reason for getting the mother's letter and the case report, because at that time I did not have them, and I could not prove the teeth had been out of the mouth.

After that I showed them to a surgeon who has an office in the same building I have at Bay State Road, and he said, "I wish I had seen that sooner because I could have put you on the track of getting similar things in medical history, for instance, in traumatic amputation where a woodcutter had chopped off a finger, and some time later they had searched around in the chips and found it, and sewed it on." He told me of two recent cases that were not published nor written up. One of them occurred in Newton, where a builder in the town had an accident and cut off his ear completely. He took the ear and went over to the Newton Hospital, and a doctor there sewed the ear back on. The circulation was re-established and the ear is a perfectly normal ear today. In another case a chap out in some little town in Massachusetts had an accident in a barn and took his whole scalp off, which landed among the debris in the cow barn. He picked it up and took it to a doctor who very carefully washed it off and cleaned it with a salt solution or something of the sort and sewed the scalp back on, and he has a perfectly good functioning scalp today.

Those are the lines which I have not yet had a chance to follow up. Perhaps some one here has access to medical case reports in which traumatic amputations have taken place of various members of the body, which have been severed for various lengths of time, and then replaced, and where a successful union was accomplished. I think that is the line we have to look along and search along. Heretofore we have been thinking of the teeth as containing pulps that are very easily injured and very easily killed. Such is the case in adulthood. But here we have a young boy seven years old, and, as Dr. Riesner said, when we have young, healthy, you might say embryonic tissue in that root canal and around that apex, there is no reason why it should not be saved. It was placed back in its own environment, its own body fluids. The chemistry is right. It is not a foreign substance from somebody's else body; it is the same tissue elements, the same chemical composition, the same serum and blood, and so on. We know from the reorganization of a clot that the tissue cells, connective tissue fibrin, form the matrix; that capillaries send out buds into that clot and reorganize it; that terminal nerve tissue grows out into that clot and reestablishes sensation. Why should it not do it with the pulp contents of a young, healthy growing tooth, with a wide open funnel-shaped canal allowing plenty of access for these new elements to go into it?

I think that is the only answer I can give. I don't know whether I am right or not.

CASE OF BILATERAL DISTOCLUSION

EDWARD I. SILVER, D.M.D., BOSTON, MASS.

HISTORY.—Boy, aged eleven years and eight months, presented for treatment April 26, 1932. Thumb-sucking habit persisted up to age three. Chickenpox, whooping cough, measles, and otitis media all at preschool age. No hereditary characteristics. Mouth-breather. Height, sixty inches; weight sev-

Fig. 1.

Fig. 2.

Fig. 3.

enty-five pounds (underweight). General health considered good. Very little caries. Extraoral radiographs were negative (Fig. 1).

Photographs (Fig. 2) brought in by patient indicate that the condition started early in life (photographs at fifteen months and at ten years).

Fig. 3 (photographs taken April, 1932) shows position of lower lip under maxillary anterior teeth.

Presented to the American Board of Orthodontia, March 10, 1936.

Etiology.—Thumb-sucking and with mouth-breathing I believe are very important causative factors in this case.

Diagnosis.—The premature loss of the mandibular deciduous molars permitted a certain amount of collapse (possible mesial migration of the first molars and distal collapse of the anterior teeth). This case was considered Class II, Div. 1, Angle's classification.

Treatment.—Hawley chart 36 indicated considerable lateral expansion necessary and retrusion of maxillary anteriors. Median line of lower off to the right 2 mm.

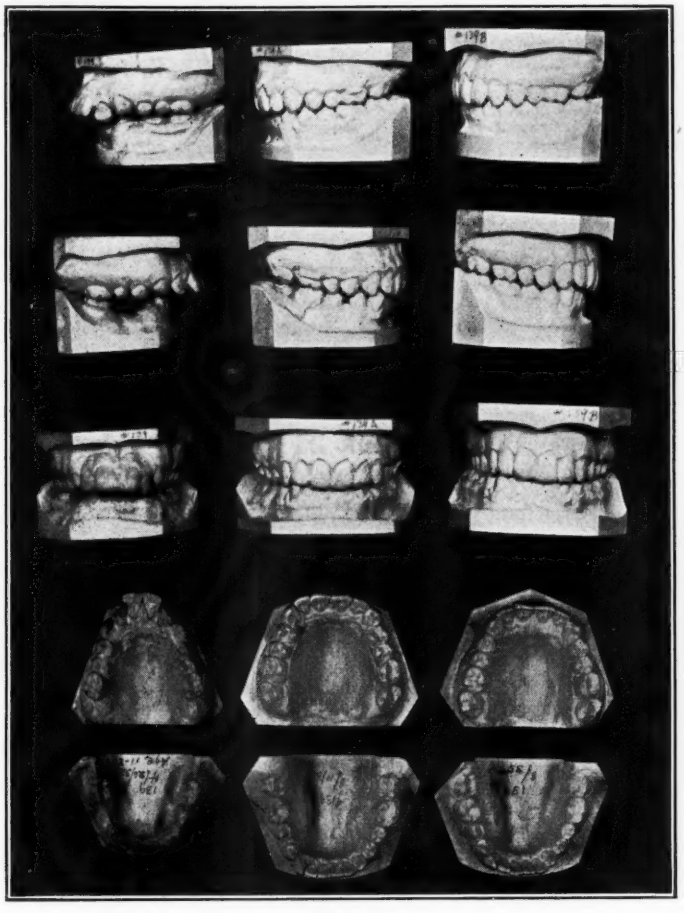


Fig. 4.

Slight distal movement of the mandibular first molars was attempted using the lingual arch wire, as well as the anterior movement of the mandibular incisors, and correction of median line, with the same appliance using auxiliary springs of 0.020. A round labial arch wire 0.036 was used on the maxillary arch for expansion, general development, and retrusion of the anterior teeth. Intermaxillary elastics were then used to correct distoclusion and to stimulate vertical growth of the posterior teeth and correction of overbite.

Fig. 4 shows views of the three models, taken April, 1932, September, 1934, and September, 1935, for comparison.

This patient was taught the pterygoid and the masseter-temporal exercises for myofunctional therapy. The celluloid card was used for toning up the orbicularis oris muscle.

No Hawley or inclined plane was used in this case, but on March 21, 1934, as a retainer the patient wore a maxillary labial arch wire at night only with intermaxillary elastics. All appliances have been removed since August, 1935.

Results.—I believe a good functional occlusion has been established and with it the lips fall into their proper position as shown by photographs, Fig. 5, taken March, 1935.

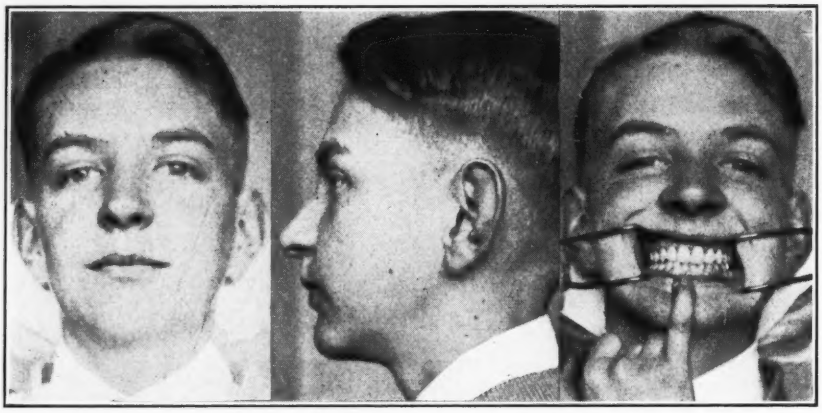


Fig. 5.

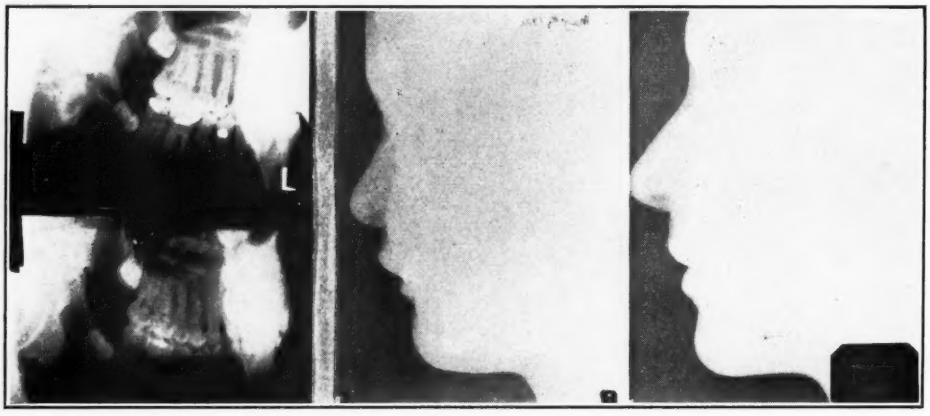


Fig. 6. Fig. 7.

Fig. 6 shows extraoral radiographs for comparison at completion of treatment.

A very interesting comparison is shown by the x-ray profiles for contrast of soft and hard details before and after treatment (Fig. 7).

Prognosis.—This boy is very cooperative and is keeping up his exercises, and I therefore believe we have every reason to expect an improved and satisfactory occlusion as time goes on.

CHROME ALLOY APPLIANCES AND SOLDERING TECHNIQUE

MAX R. KADESKY, D.D.S., DUBUQUE, IOWA

CHROME alloy can be successfully employed in the practice of orthodontics. We are told by many of the men practicing orthodontia that the appliances are just a means to an end, that we need appliances to do certain things. Does it matter then what materials are used as long as satisfactory results are obtained?

My fees do not permit me to use only precious metals in my practice. For that reason, five years ago I gave chrome alloy a trial. At first I used it in my office sparingly; now I use it almost entirely.

I have not experienced the many difficulties which have been reported by others in constructing appliances of chrome alloy. There is some breakage, but the break usually can easily be re-soldered. The solder in some mouths does discolor, but this can be easily polished. On the other hand, chrome alloy wires retain their life or pep longer than gold alloy wires. They remain bright, are easily cleaned, and are inexpensive.

I recommend using oralium band material for all bands, precious metal or Aderer's new gold alloy buccal tubes and the Ellis tube for the one piece lingual arch. Using the Ellis tube, a one piece lingual arch can be constructed without soldering a half round post to fit the ordinary lingual tube. This is highly recommended also, because of the ease in which a new lingual arch of this type can be adapted in the mouth in case it becomes necessary to change to a larger appliance. McCoy's open tubes or Ketcham hooks are preferred when anterior attachments are needed.

Using the above mentioned materials for the base of my appliance, all worry of breakage due to the materials used is eliminated. From this point the chrome alloy wires are used for labial and lingual arches, finger springs, hooks, spurs, etc. This assemblage, bands and their attachments of precious metals and the remainder of the appliance of the chrome alloy, eliminates the necessity of using electric welders or spot welding machines.

Practically no change from the present technique of soldering precious metals is necessary. The operator must exercise more care in removing the wires the instant that the solder flows, and he must use more flux and more solder.

After the labial and lingual arch has been shaped (instructions for making the Ellis one piece lingual arch may be obtained from the Rocky Mountain Metal Products Co.), mark the location of necessary auxiliaries. You are now ready for the soldering.

Clinic presented at the Thirty-Fifth Annual Meeting of the American Society of Orthodontists, Chicago, April, 1937.

Technique for making any union with the chrome alloy wire is as follows:

1. Hold the wire over the flame for two seconds, just long enough to warm it. This takes grease or other foreign substances off, allowing the flux to hold.
2. Apply the flux when wire is warm. Proper flux is vitally important. J. J. Guerrero's stainless steel flux has given me the best results. Flux at least one-half inch. Be sure that the flux protects the entire area.
3. Flow the solder on the larger wire; my choice of solder is J. J. Guerrero's stainless steel solder. Do not hold the wire directly in the flame; about one-half inch above the blue flame is the desirable place for soldering. It is important that the wire be removed the instant the solder flows. If this is not done, the temper of the wire may be lost.
4. If the solder flows slightly but is inclined to ball, stop, apply more flux when warm and proceed as before. This will not happen if care is exercised in applying the flux and the solder.
5. In adding finger springs, stop loops, etc., apply the solder to the larger wire as described above. Solder can also be flowed on the smaller wire, but this is not necessary. Warm the smaller wire, flux well. Heat the larger wire first, bring the smaller wire to place of union the instant the solder flows. Remove wires immediately. Instant removal of wires at the proper time will prevent loss of temper.
6. While the wires are hot, plunge them in cold water. This seems to regain some of the temper.
7. Remove the crust that has formed at the solder joint. This may be done with pliers or a knife. If soldering has been done carefully, after the flux is removed you will notice but little discoloration or oxidized area.
8. Pickle in vinegar.
9. Polish the appliance using J. J. Guerrero's chrome alloy polish. When buffing speed up the motor, for if the wires get warm or even hot, it helps bring back some of the spring that may have been lost. Friction gives hardness and spring to stainless steel.

You will be astonished at the ease of this technique; there is no new electrical apparatus to master, since the wires are soldered with practically the same technique that you follow in your present method. I believe that if the proper flux is used and that if this technique is mastered, with care to remove the wires as soon as the solder flows, that very few complications will be encountered in using chrome alloy for orthodontic appliances.

The following materials are recommended for constructing chrome alloy appliances:

Hutton's chrome alloy wires; J. J. Guerrero's chrome alloy polish, stainless steel solder and flux; oralium band material; Ellis lingual tubes; Aderer's buccal tubes; Ketcham hooks; and McCoy tubes.

Department of Oral Surgery

Edited by

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CEMENTOBLASTOMA

KURT H. THOMA, D.M.D., BOSTON, MASS.

Charles A. Brackett Professor of Oral Pathology

AMONG the pure forms of hard odontomas involving only one of the dental tissues, the cementoma is perhaps the commonest. The mass of cementum discovered by x-ray examination, however, is only a by-product, formed by a cellular stroma, which is the active and primary part of the neoplasm; therefore the term cementoblastoma is more descriptive. During the growing stage of the cementoblastoma the cellular part of the lesion is present in proportionately large amounts; later a stage of completion may be reached when the cellular elements have exhausted themselves and are reduced to a thin connective tissue encapsulation which remains around the calcified cementum. Cementoblastoma therefore when found in its incipient stage is liable to be entirely cellular in nature, containing no calcified tissue as yet. This cellular stage may be looked upon as a fibroma; indeed, Siegmund and Weber[1] believe that a central fibroma in the jaws may ultimately be transformed into either a cementoma or an osteoma. According to my recent investigation, however, cementicles of very small size form in the cementoblastoma early, as shown in Fig. 1. The diagnosis of central fibroma should therefore be made only if no cementicles are found by microscopic examination in lesions of considerable size.

DIAGNOSIS

Cementoma produces no subjective symptoms; it generally remains relatively small and is contained within the bone. In rare instances, however, it may grow expansively and produce deformity of the jaw or face (Fig. 6). The tumor is much more common in the mandible than in the maxilla, and often occurs in multiple forms (Figs. 2 to 4). Stafne[2] found in 10,000 patients who had a routine roentgen examination made, an incidence of 24 cases of cementoma; the ratio of mandibular to maxillary cementoma was seventeen to one and women were more frequently affected than men. The youngest patient I have observed with a very large mandibular lesion was seventeen years old.[3]

From the Department of Oral Pathology, Harvard University Dental School.

Roentgen examination does not give uniform results and in some cases is not diagnostic. The radiopacity of the tumor depends entirely on its stage of development, that is, its histologic structure. Radiographically one may distinguish three stages of development.

1. *The osteolytic stage* represents the immature cementoma which is composed of cellular tissue with no calcified structure deposited as yet. The tumor forms at the expense of the bone, and the loss of the bone produces a radiolucency which is seen as a dark area in the x-ray picture. Stafne, who has made a careful study of this stage, states that the roentgen appearance gives rise to frequent misinterpretation because the lesions occurring in the subapical area often resemble a granuloma or a small radicular cyst. Differential diagnosis can be established only if the related tooth is normal and there is no question of pulp or periapical infection.

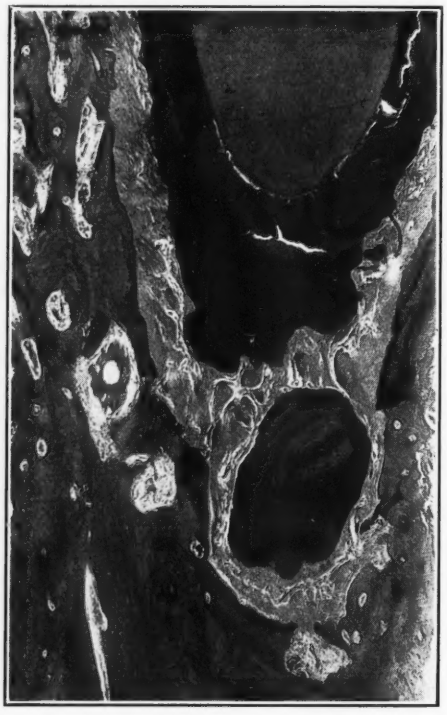


Fig. 1.—Cementoblastoma with cementicle forming in subapical area. Note hypercementosis of apex of tooth.

2. *The cementoblastic stage* is the stage in which cementoblasts have started to form cementum. The deposited tissue which becomes calcified is radiopaque and therefore produces an image on the x-ray negative which is quite characteristic, although it has been referred to by some in the past as a calcified granuloma. In this stage the cellular tissue is still active and abundant, and therefore leaves a dark area of considerable thickness around the centrally located radiopaque structure. The bone surrounding the cementoblastoma generally is dense, due to the formation of a cortical lamina encasing the tumor. This is similar to that seen around a cyst (Fig. 6).

3. *The mature inactive stage* is recognized in the x-ray when the calcified structure is surrounded by merely a thin dark area, indicating that the soft

part is now represented only by a remnant of connective tissue encapsulating it (Figs. 2 and 3). Several observers have found little change in the size of mature cementomas when observing them over a period of years. This would indicate that the tumor reaches an inactive stage when there is little likelihood of its growing very much larger.

Fig. 2. Fig. 3.

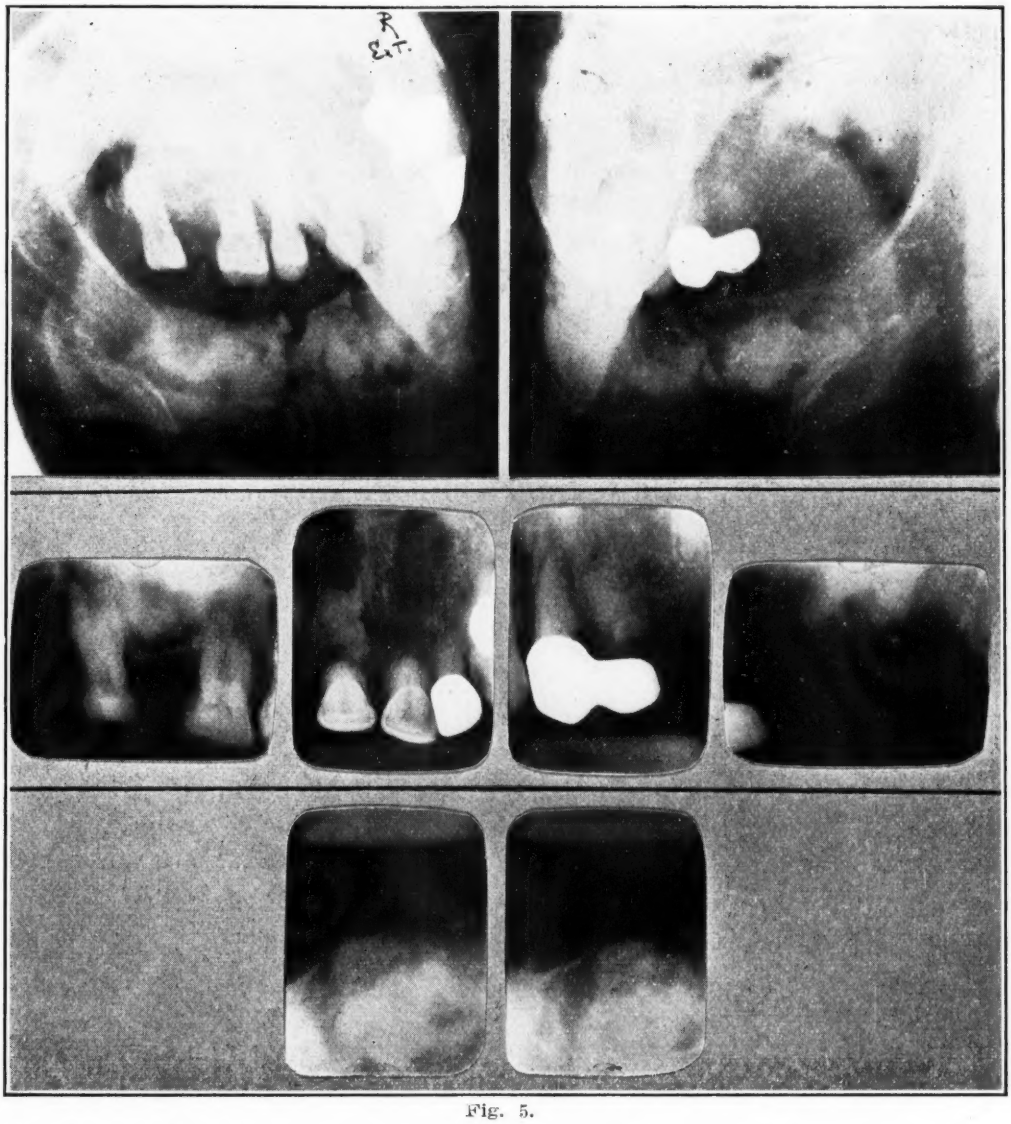


Fig. 4.

Fig. 5.

Figs. 2 to 5.—Multiple cementoma in mandible shown in Figs. 2, 3, and 5, in maxilla in Fig. 4. (Courtesy Dr. H. A. Potts.)

Microscopic examination of tumors which seem to have stopped enlarging (Fig. 11 *A* and *B*), however, shows that there is still activity in the cellular elements (Fig. 14), and that therefore there is a potentiality present which may cause a more rapid development and enlargement as a result of local or general growth-promoting influences.

Multiple Cementomas.—Cementomas vary in size; some remain comparatively small while others attain very large dimensions. Cases have been observed of cementomas occurring in various parts of the jaw, often both in the mandible and in the maxilla at the same time. In such cases we may speak of multiple cementoma or cementomatoses. Dr. Potts furnished me x-rays of a case of multiple cementoma. In the mandible the cementomas had attained extremely large dimensions (Figs. 2 and 3), while a number of smaller cementomas were found in the maxilla (Fig. 4).

DIFFERENTIAL DIAGNOSIS

Hypercementosis must not be mistaken for cementoma. In hypercementosis so-called osteocementum containing cement corpuscles is deposited peripherally at the root of a tooth. The condition as a rule is associated with some form of irritation, traumatic or infectious in nature. In cementoblastoma the tumor tissue forms in the subapical area in large amounts away from the teeth, although frequently a tooth or several teeth are connected with it (Fig. 8).

Osteosclerosis must be differentiated. This is not difficult as it is a diffuse process, not circumscribed as is the cementoma.

Osteoma occurs more frequently peripherally. When central (fibro-osteoma), it is liable to contain a spongiosa, while the cementoma is solid except for nutrient canals. In some cases microscopic examination must be awaited for a final diagnosis of the case.

PATHOGENESIS

Most types of odontoma are formed during the developmental stage of the tooth, the tumor being produced by abnormal development of a particular tooth germ in place of a normal tooth. Cementoma, however, is not produced in this fashion because a cementoma forms not instead of, but in addition to, regularly developed teeth. The explanation is not difficult. The dental follicle from which the cementum originates is a late development of the tooth germ; it forms after the enamel organ and the dentin papilla have developed. The tooth therefore develops normally; the tumor originating either from the apical part of the dental follicle or its end-product, the mature periodontal membrane.

The microscopic picture of the immature cementoblastoma or the fibrous tissue around the calcified type proves this because it shows the same type of connective tissue as seen in the apical periodontal membrane. According to this theory the cementoblastoma starts as a growth from the immature or mature periodontal tissue at the apex of a tooth, replacing the bone by its structure in similar fashion as does a granuloma. This gives rise to the misinterpretation of the x-ray picture as stated above. In most cases the cementoblastoma produces cementicles early, as illustrated in Fig. 1. In this case a cementoblastoma with cementicle is seen developing from the periodontal membrane in the subapical area. The effect of the cementoblastoma on the root apex is of interest. We see considerable hypercementosis around this tooth, indicating that the development of the tumor affected the preformed normal cementoblasts at the

periphery of the apex also, stimulating them to abnormal activity. The section also shows evidence of osteoclastic resorption of the osseous structure creating a bone cavity in which the tumor develops. In more advanced cases the increased size of the cementoma causes expansion of the bone by endosteal resorption and periosteal apposition. Continuous production of cementum may bring the cementoma in close relation to the roots of the adjoining teeth (Fig. 8), and indeed may cause actual fusion of the hypercementosed teeth to the tumor.

The formation of multiple cementomas may be associated with general hypercementosis of the teeth, pointing to a predisposing influence if not a constitutional etiologic factor.

PATHOLOGY

In the early stage of development we find a cellular stroma made up of young fibroblasts, collagen fibers and few blood vessels, a structure resembling the young peridental membrane at the apex of the tooth. In this tissue cementicles form which are small at first and isolated. Later, when they increase in number and size, they fuse together to form a solid mass of calcified tissue. This consists of cementicles or trabeculae which vary in microscopic appearance from the type known as octeocementum to a less differentiated mass of calcified osteoid. This cementum-like tissue can be distinguished from bone by the concentric arrangement of the trabeculae (Fig. 9) which become fused together, by the granular and irregular calcification of the tissue, by the presence of cementoblasts bordering the cementum, by the shape of the cement corpuscles and lacunae similar to those found in the osteocementum of a tooth. The marrow spaces in the cementoma contain fibrous connective tissue in which the formation of new small cementicles can be often observed.

In the mature type of cementoma there is little cellular stroma present; what there is may be found on the periphery (Fig. 13) as well as between the trabeculae (Fig. 14). In the peripheral capsule we often see evidence of apposition which accounts for the growth of the tumor. Apposition can also be seen in the cellular spaces enclosed in the calcified mass itself where cementoblasts of the large and active type deposit new layers of cementoid, recognized by the lighter stain (Fig. 14). The cellular part of the tumor decreases constantly on account of this deposit, transforming the tumor into a more and more solid calcified structure.

There is also evidence of lacunar resorption in some of the specimens examined; osteoclasts can be found attacking the surface of the tumor, which may be an effort of the host (jaw bone in which the cementum forms) to remove the foreign structure, or it may be the regular process of resorption that normally balances apposition of bone in order to keep the center of the bone trabeculated.

TREATMENT

The treatment of cementoma consists of surgical excision. As the tumor is slow growing and encapsulated, the operation becomes one of choice. If the tumor is small and its removal would require the extraction of normal useful

teeth, I should keep it under observation for an indefinite period of time. If the tumor is large, containing a great deal of fibrous tissue as the one shown in Fig. 6, I should advise operation, particularly so if there is expansion of the bone and facial disfigurement. The removal of the teeth over the tumor is probably always indicated because of disturbance of their blood supply and the fact that the cellular structure of the tumor is part of the periodontal mem-

Fig. 6.

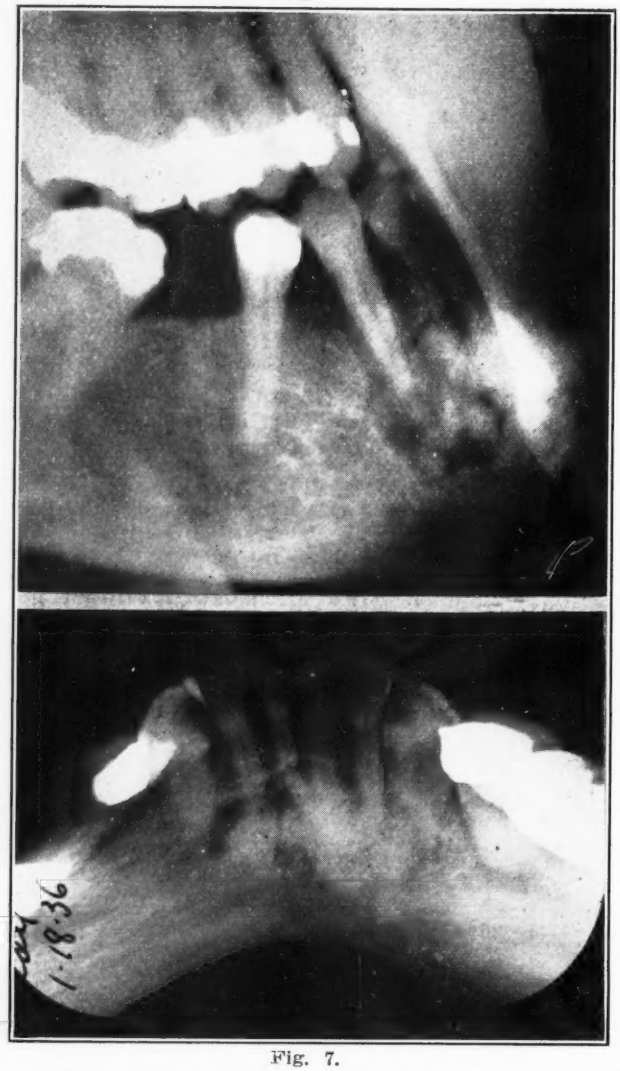


Fig. 7.

Fig. 6.—Case 1. Roentgen picture showing active cementoma in mandible.
Fig. 7.—Occlusal film showing incisor area.

brane. There is, however, no reason why in favorable cases, treatment of the pulp canal and apicoectomy may not serve the purpose.

CASE REPORTS

CASE 1.—Mrs. C. L. E., aged sixty-four years, complained of a hard swelling in the mental fossa.

History.—She had a routine x-ray examination two years before by her dentist, who found a cyst in the anterior part of the mandible, containing

radiopaque tissue. Since then a hard swelling had appeared in the mental fossa which slowly increased in size. She cannot remember any accident to her jaw or to the mandibular incisors; she had never had any pain or soreness of the teeth.

Examination showed a well-cared-for mouth. Mucosa and gingivae were normal in appearance and color. There was expansion of the bone on the anterior surface of the mandible below the incisor teeth obliterating the mental fossa. This swelling was hard, noncompressible, and covered by normal mucosa. The incisor teeth were of normal color with no caries, but the left lateral incisor was in traumatic occlusion and got tender at times. Roentgen examination was advised.

Roentgen examination showed in lateral view a cystic area expanding the bone. This extended from the left first premolar region to the right subcuspid area. On the left the cystic area contained a proportionately small amount of radiopaque structure (Fig. 6), while in the subincisor region the cystic area

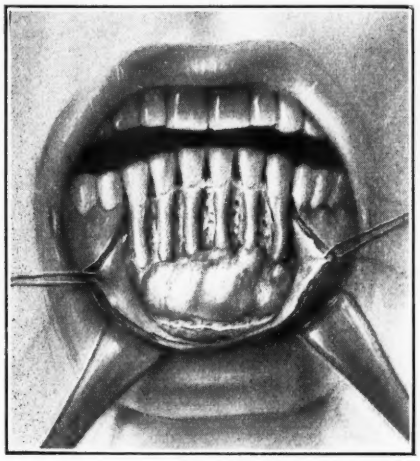


Fig. 8.—Case 1. At operation, cementoma exposed.

was almost completely filled with similar tissue (Fig. 7). The apices of the incisors were in close relation to this structure, and the apex of the left lateral incisor showed a round radiopaque swelling at the apex. There was no evidence of hypercementosis on the remaining teeth in the upper or the lower jaw.

Diagnosis.—Cementoblastoma of the active growing type.

Operation.—The operation was performed at the Brooks Hospital with gas and ether anesthesia. An incision was made along the alveolar border from the left first premolar to the right first premolar, and the mucoperiosteum detached and retracted. The bulging cortex was now visible and was removed with a chisel. This exposed a hard tumor of irregular rounded outline into which the roots of the incisors extended (Fig. 8). With an exolever the entire mass could be loosened from the surrounding bone to which it was attached by a fibrous membrane. On removing the tumor, however, it broke into several pieces. One of the larger ones attached to the left central and lateral incisors was preserved for microscopic study. The other incisors, two cuspids, left first premolar, and right first premolar, which was root filled and infected, were

extracted. The cystic cavity lined by cortical bone was now visible and after rounding sharp projecting bony ridges the mucoperiosteal flap was collapsed into this cavity and held by twelve sutures. Recovery was uneventful.

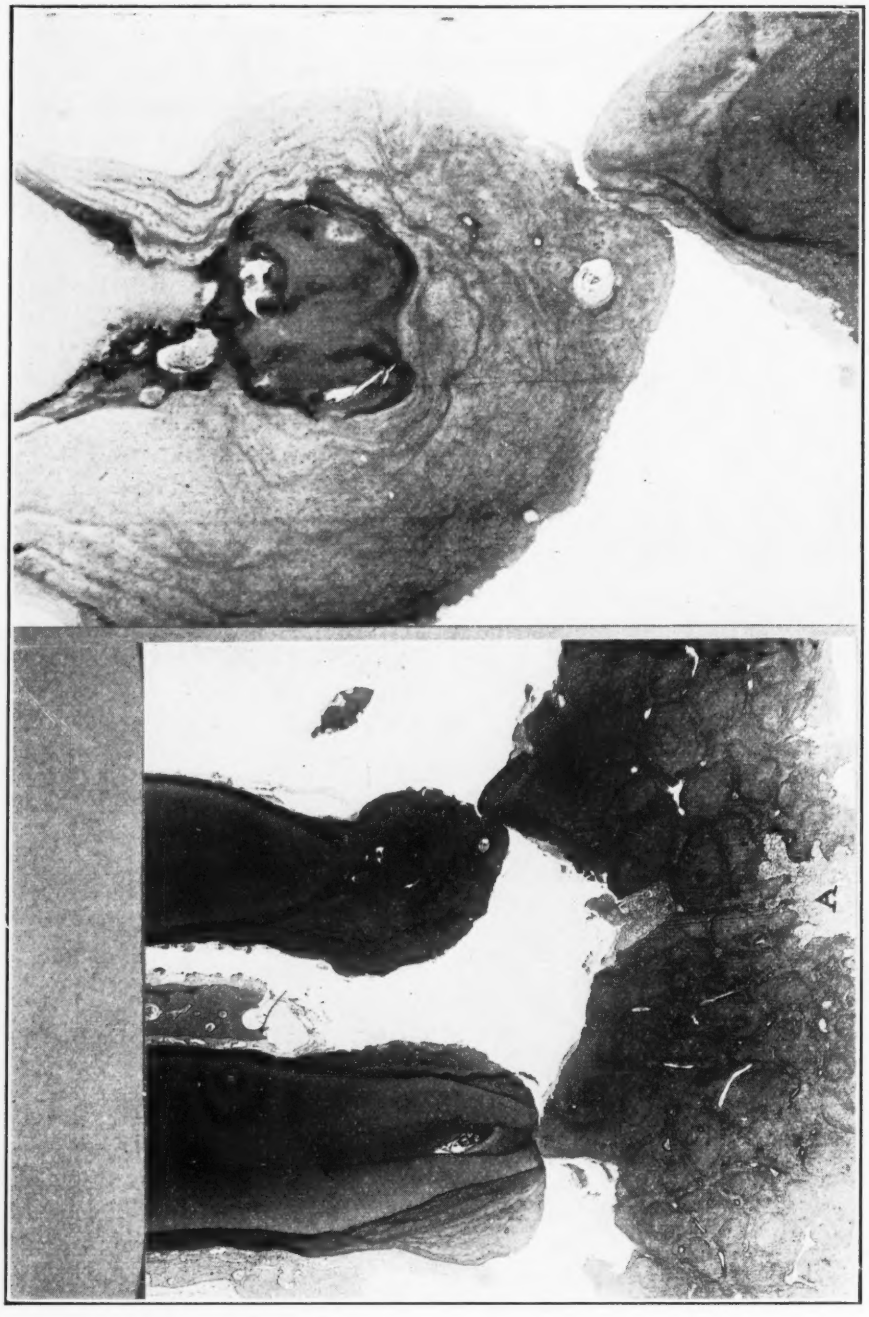


Fig. 9.

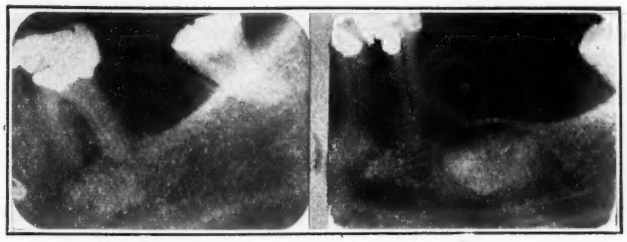
Fig. 10.

Fig. 9.—Case 1. Photomicrograph showing part of cementoma. It is made up of concentric cementicles. Teeth show hypercementosis. *A*, area of resorption.

Fig. 10.—Photomicrograph, high magnification of hypercementosis of apex of tooth, showing haversian canal. Note also part of tumor made up of similar tissue.

Pathologic Examination.—The specimen consisted of four incisors with a hard globular, calcified structure attached to the apices. The latter measured $1.2 \times 0.7 \times 0.7$ cm. The specimen was cut in frontal section.

Microscopic examination showed the teeth to be unaffected by caries. The pulps showed normal tissue. The apices showed evidence of hypercementosis,



A. *B.*

Fig. 11.—Case 2. *A*, old x-ray film; *B*, later x-ray picture after extraction of tooth and healing of bone around cementoma.

Fig. 12.

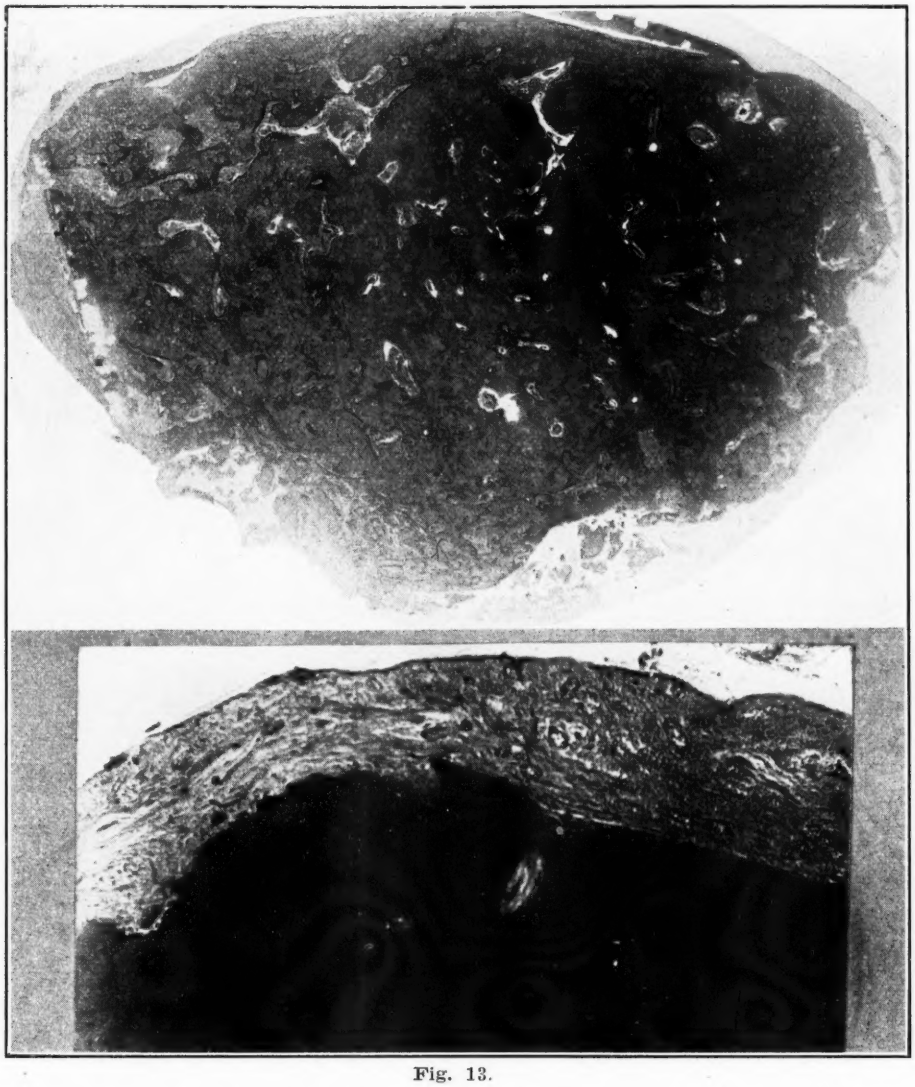


Fig. 13.

Fig. 12.—Case 2. Low power photomicrograph of cementoma showing irregular trabeculae of osteocementum.

Fig. 13.—Case 2. Photomicrograph, higher magnification, showing capsule of tumor. There is evidence of lacunar resorption on left and new formation.

especially the left second incisor (Fig. 9). In Fig. 10, a higher magnification of this tooth, we see a central cementicle attached to the very apex which resembled in staining power the primary cementum on the tooth. This was enclosed in osteocementum resembling the tumor tissue and being made up of many lamellae, concentrically arranged with numerous cement corpuscles, and containing haversian canals. The tumor was in contact with this structure and might have been attached to it. The first incisor (Fig. 9) showed lateral hypercementosis, the apex was in contact with the tumor and the foramen seemed closed by the ingrowth of cementum.

The tumor was made up of globular cementicles, the lamellae of which were arranged in concentric fashion, and the cement corpuscles were quite characteristic and easily distinguished as such. The cementicles were fused together,

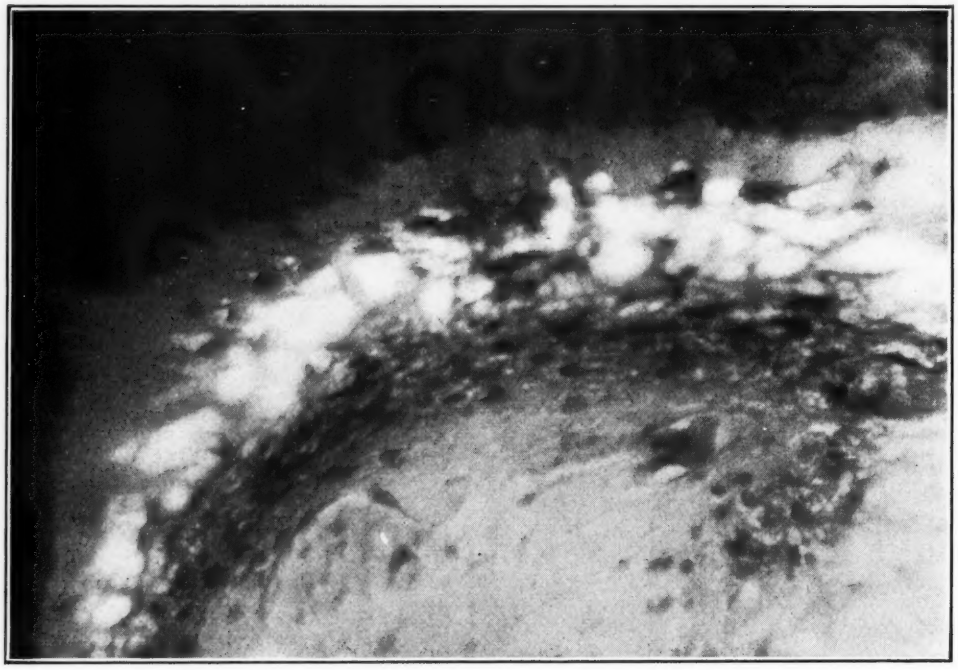


Fig. 14.—Case 2. Photomicrograph, high power, showing part of the wall of a marrow space. Note cementoblasts and active deposit of cementoid.

leaving but small channels which served as nutrient canals. The small amount of soft tissue attached to the specimen had the general structure of the periodontal membrane, in some places (at *A* in Fig. 9) there was evidence of lacunar resorption, probably indicating an attempt to remove from the spongiosa the solid tumor tissue.

Case 2.—Patient L. M. H., aged forty years, had a routine x-ray examination previous to extraction of her maxillary teeth. A dense round structure was found under the left mandibular first molar.

History.—Patient had all teeth extracted in maxilla a month before, also the mandibular left first molar. The x-ray picture taken of this tooth previous to the extraction is shown in Fig. 11*A*. She had no pain, swelling or other symptoms.

Roentgen examination showed an oval radiopaque structure surrounded by a dense layer of bone from which it was separated by a dark line. This appearance was consistent with encapsulated odontoma, probably cementoma (Fig. 11*B*).

Diagnosis.—Cementoma.

Operation.—Under gas and ether anesthesia an incision was made in the mucosa over the tumor. A large window was cut into the cortex of the bone where a hard calcified structure was exposed. This was detached and removed in one piece, and preserved for microscopic examination. The wound was closed with sutures after a blood clot had filled the cavity.

Pathologic Examination.—The specimen received was a hard structure measuring 1.2 × 1 × 0.9 cm. Microscopic examination showed an irregularly calcified tissue containing typical cement corpuscles in lacunae with canaliculi such as seen in osteocementum. The trabeculae were not concentric and resembled those seen in osteoma dura, and on account of continuous growth left only very small marrow spaces (Fig. 12). The latter contained fibrous connective tissue and were lined by active cementoblasts which seemed to deposit new matrix recognized by the lighter stain (Fig. 14). This indicated that the tumor was still growing. Blood vessels were well established, and often small cementicles were encountered in the center of the marrow space. There was very little tissue attached to the periphery of the cementoma, except on one place where it showed similar appearance to that of periodontal membrane (Fig. 13). The microscopic picture was consistent with cementoma.

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47 Bay State Road

REPORT OF FOUR FOLLICULAR CYSTS—DENTIGEROUS

GEORGE F. SEEMAN, D.D.S., NASHVILLE, TENN.

L. H., male, aged sixteen years.

History.—Patient has suffered for several years from periodical headaches, and complains of bad taste in the mouth. He has no local pain in teeth or jaws.

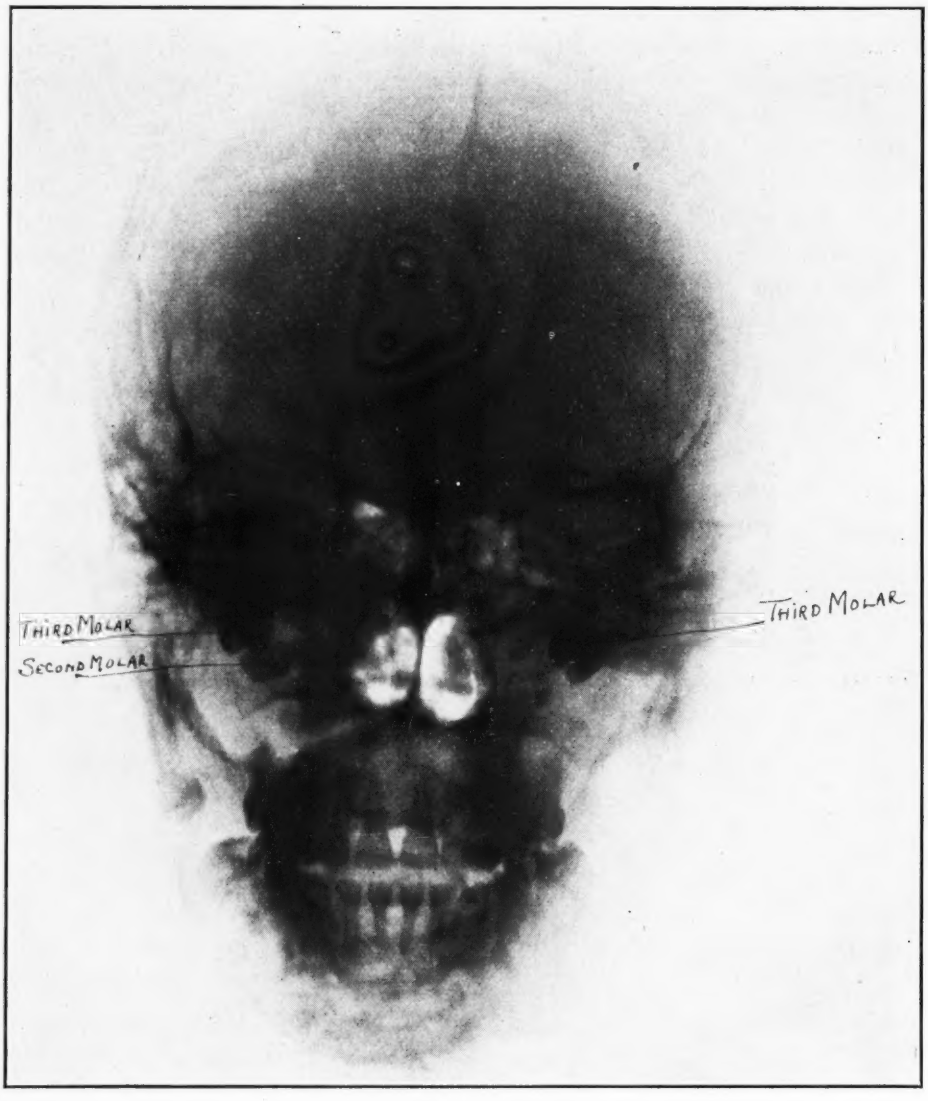

Fig. 1.

Examination.—Fistulas are noted in the region of the maxillary third molars, and a probe can be passed a great distance.

From Meharry Medical School, Department of Dentistry.

Fig. 3.

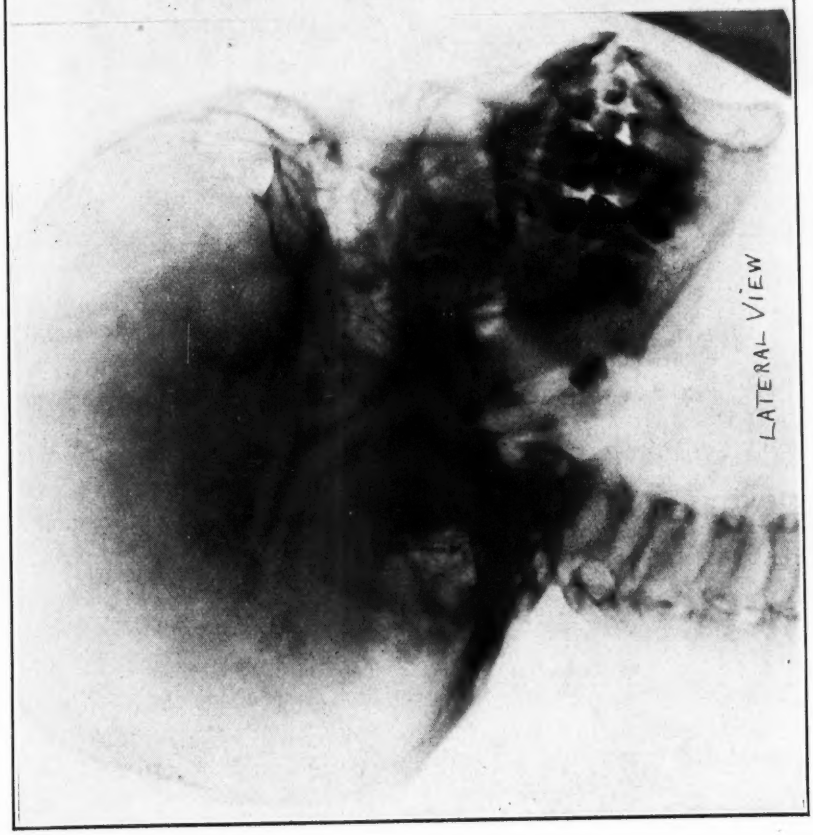

Fig. 2.

Roentgen Findings.—Skull views, anterior-posterior and lateral views show second and third maxillary right molars displaced below orbital cavity; third maxillary left molar displaced below orbital cavity; mandibular third molars right and left displaced posterior and upward in the rami; mandibular second molars in a distoangular position.

Treatment.—Under infraorbital and tuberosity injections, the maxillary follicular cysts were opened by the removal of the outer plate of bone in that

Fig. 4.

Fig. 5.

region, and the second and third molars were removed together with cystic sac. Both antrums were opened during operation, and iodoform gauze dressings were inserted. Three weeks later the patient was discharged with very small openings, and the antrums were apparently clear. The mandibular teeth were also removed by the routine technique.

This case is an example showing how far teeth can be displaced by pressure from developing cysts.

SURGICAL CONSIDERATION OF ABNORMAL FRENA

DOUGLAS B. PARKER, M.D., D.D.S., NEW YORK, N. Y.

THE paths of oral surgery and orthodontia run along parallel lines, and in many places they converge. Both specialties are dependent in many respects on each other for cooperative effort in securing the best results in the treatment of their patients. Among the many places in which cooperative effort is effective is in the handling of abnormalities of the labial frena.

In reviewing the literature on this subject, we find that there is some variation in nomenclature. The term frenum has been applied to both of the lips and the tongue. Gray's *Anatomy* applies the term frenulum to the lips and frenum to the tongue. Probably the profession generally has applied these terms somewhat interchangeably. The labial frenum or the frenulum labii superioris is of particular interest to the orthodontist because of its mechanical action. This labial frenum is a fold of mucous membrane and connective tissue forming a sort of median raphe on the undersurface of the lip and connected in the midline to the gums attached to the alveolar bone. The attachment of this labial frenum is usually in the midline about half a centimeter above the gingival margin of the gum in the adult. In the infant the attachment appears to be right at the alveolar ridge in the midline. As the child develops and the deciduous teeth erupt, the alveolar process develops and the attachment seems to be higher. This is apparently relative, as it is probable that the attachment does not rise. It is the alveolus that develops below this attachment. The frenum varies in width from a thin knifelike band to one of four or five millimeters in width. Occasionally we see what appears to be two distinct bands of attachment (Fig. 1). The base of the frenum is spread out in a fan-shaped origin in the mucosa of the underside of the lip. There are practically no muscle fibers in this band. It is made up of connective tissue with dense white fibers. This is covered by mucosa which is lined by stratified squamous epithelium. The central portion contains arterial and venous capillaries, lymphatics and small nerves.

The function of the frenum seems to be that of a rudimentary attachment, which does limit the motion of the upper lip, and appears to give some stability to the orbicularis oris muscle. As there are no striated muscle fibers, it does not have any direct motion or power to contract.

Abnormalities of attachment of the labial frenum are observed in that the insertion into the alveolar interproximal gum may persist after the complete eruption of the permanent central and lateral incisors. Some have suggested that this might be due to the separation of the maxillary bones and the attachment of the frenum between the premaxillary bones. Radiographs of the area do not tend to confirm this opinion, as the median suture does not show any

Read before the New York Society of Orthodontists, New York, March 16, 1937.

separation in these cases. In the infant it may be possible that in some frena the attachment may go over the alveolar ridge and be inserted into the palatal aspect close to the incisal foramen. In this type of case the development of the alveolar bone and permanent incisors takes place and the attachment stays in between the central incisors.

The deformity resulting from the low attachment of the labial frenum is often a separation of the central incisors. This separation may vary in many ways. The incisors may be tipped so that the crowns are inclined toward the lateral incisors, or the teeth may just be separated with the long axis of the central incisors in the normal vertical plane. All spreading of the maxillary central incisors is not due to abnormal attachments of the frenum. Heredity and other developmental factors may have a bearing on the separation as well. Where a wide low attachment of the frenum exists after the eruption of the six anterior maxillary teeth, we are inclined to feel that the band of connective tissue has had a bearing on the retention of this separation (Fig. 2). It is rational to believe that mechanical force of appliances exerting pressure on the

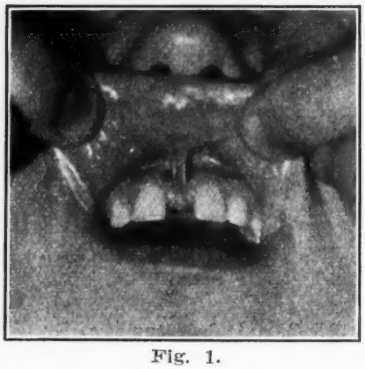

Fig. 1.

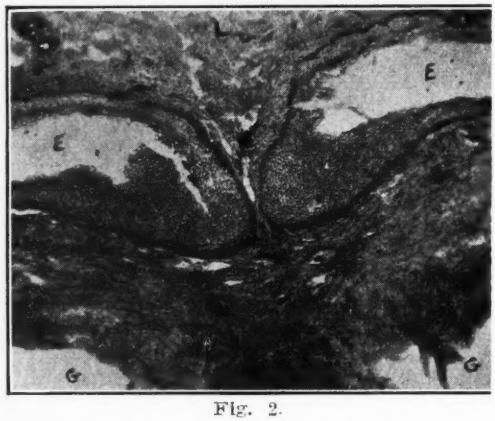

Fig. 2.

Figs. 1 and 2.—(From Dewey-Anderson, Practical Orthodontia, The C. V. Mosby Co.)

central incisors can close this space, despite the existing band; and, if this force is maintained, the separating band will be compressed and will undergo a pressure absorption. If, on the other hand, the pressure to close this space is not constant and the elasticity of the tissues can exert a lateral pressure interproximally on the central incisors, the space will probably be maintained and the deformity will exist. Another effect of the persistence of these abnormally attached frena is a restricted motion of the upper lip which may affect the facial expression of the individual, as in laughing or other facial muscular action. It may affect to some degree the phonetics of the person as well. The resulting separation of the teeth may also affect the phonation by giving a lisping or whistling sound due to the space.

The decision as to the advisability of interfering with these abnormally attached frena is one which seems to be debatable. In 1933 a questionnaire was sent out to a number of prominent orthodontists, asking their opinion as to the advisability of surgery on the frenum. The answers were not very conclusive, as some questioned the advisability of ever doing such an operation, others

advocated operation only after a relapse, still others advocated conservatism and some, notably the late Martin Dewey, advised the removal of all abnormal frena. I quote from an editorial of Dr. Dewey in the *Review of Orthodontia* in April, 1933, in which he states, "It is our belief that satisfactory orthodontic results can never be obtained when an abnormal frenum is present, without its surgical removal."

At times our decisions are apt to be influenced by our desires. The surgeon is usually eager to operate, while one who does no surgery is more apt to be conservative as far as surgery is concerned. We should, however, carefully analyze each individual case that presents, without any thought but the one governing the best interests of the patient at hand. My own feeling is that it is seldom necessary to advise operation before the permanent incisors have erupted, unless the frenum is short enough to affect lip movements or facial expressions. If, after the permanent incisors have erupted, we lift the upper lip and the tension placed upon the frenum blanches the tissue between the incisors, we may then say that its removal is indicated. Also where we can distinctly trace the band down to the interproximal space on to the palatal surface, we advise operation. Not infrequently we see a low attachment of the frenum in an edentulous case where its presence interferes with a denture, and the denture has to be cut away at this point not only to keep the denture from causing a chronic inflammation of the frenum, but also to keep the tension of the frenum from breaking some of the suction of the denture. In such cases, surgery of the frenum is indicated.

The methods of surgery employed on excision of abnormal frenal attachments vary considerably. The old method used to be to handle it in the same manner that the lingual frenum was treated; namely, to cut across the band of tissue while it was held under tension. This did not produce the best results. While it may have relieved the tension on a short attachment for the time being, the tissue was apt to continue to exert tension by the contraction of the scar tissue along the cut. From the standpoint of good plastic surgery, it would be a poor method to pursue just to cut any tension band. Also such an operation would have but little bearing from an orthodontic viewpoint, because the tissue still persists in the interproximal area. The use of an electric cautery has been advocated by some, but I do not believe that this is the best method to employ, as it creates considerable scar tissue and is apt to destroy the peridental membrane on the mesial surface of the central incisors. I have employed and taught the operation which we speak of in plastic surgery as the V Y operation, which we use to elongate abnormally short attachments of tissue. The V portion of the incision is drawn upward and the cut portion is united in a single straight portion, making a stem on the V, converting it into a Y.

If surgery of the frenum is indicated at all, we must consider the complete excision of the interproximal connective tissue attachment. The operation can readily be accomplished under the local infiltration of novocaine and that would usually be the choice of anesthetic. If the nervous condition of the patient warrants, we can employ nitrous oxide and oxygen, as the operation can be performed quite rapidly (Fig. 3). The operative technique which we usually follow is to make an incision with a sharp thin-bladed scalpel, in the interproximal

area on either side of the frenal attachment. Care should be used that the incision should leave a very thin margin of tissue mesially to the central incisors, and not bare the cementum of the teeth. In other words, do not destroy the peridental membrane and invite recession. The incision should be made

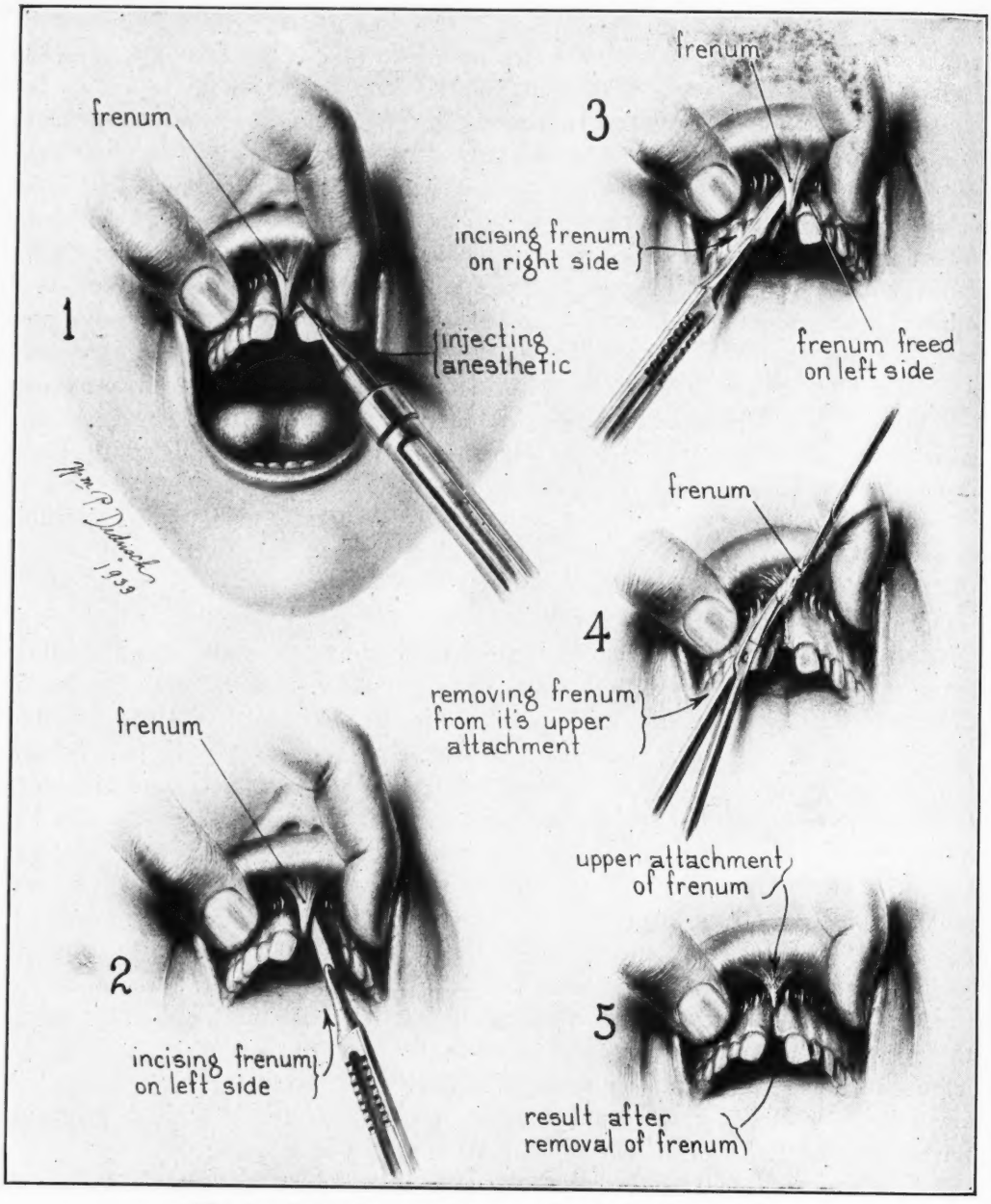

Fig. 3.—(From Dewey-Anderson, *Practical Orthodontia.*)

down to the alveolar bone, and back to the palatal side, but not back as far as the foramen. By having the assistant keep lifting the lip, thereby exerting tension, this attachment to the bone can be dissected away quite easily. The incision should be followed up on either side of the frenum in a wedge shape, to the origin of the fold from the lip. As soon as this is freed, the lip can be

lifted very readily, making it quite free. If some of the tissue on either side of the two incisions is undermined slightly with the scalpel, the margins can be approximated with one or two dermal sutures, thereby hastening healing and decreasing the amount of scar tissue resulting. We then have an excess of tissue in the vestibule under the lip, which represented the tissue cut loose from between the teeth. This can be cut off by two lateral incisions as in a wedge, and one suture approximating the two cut margins. All the sutures placed in the mucosa can be removed on the third day, and invariably these patients will make an uneventful recovery, there being almost no postoperative pain or swelling, if performed under the usual surgical technique of sterility and a minimum of trauma and approximating cut surfaces.

As to postoperative treatment, we find that coating the operative area with compound tincture of benzoin after drying the mucosa is a valuable way to protect the wound. Ordinary mouth cleanliness and avoiding trauma or lifting the lip for unnecessary inspection for the first three or four days is important. Many of us feel that it is good judgment to exert pressure on the central incisors as soon as possible after the operation, to close the space, before too much granulation tissue continues to form connective tissue in the interproximal area. This is of course taken care of by the orthodontist who places his appliances on the teeth, preferably within a week after the frenum operation.

In conclusion let me say that I believe surgical intervention is advisable where the frenal attachment is between the incisors. The operation has no ill effects, and is not attended with any danger to the patient. The operation should be performed after the eruption of the permanent incisors. The operation should embrace the excision of the interproximal tissue, down to the periosteum. Orthodontic appliances should be used as soon as possible after the operation to exert pressure on the central incisors to close the space.

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DISCUSSION

Dr. Jos. D. Eby, New York City.—It has been very interesting to search a bit through textbooks and periodicals to gather and correlate the various facts and opinions found about the frenum. The general anatomies refer to it as the "frenulum," which term may antedate the modern use of the word "frenum," though they are obviously of the same derivation. It seems to me that in modern anatomy of the face the terms "frenum-labii-superioris," "frenum-labii-inferioris," and "frenum-linguum" locate and distinguish these three tissues quite satisfactorily. But now we are interested only in the frenum-labii-superioris, its influence in the spacing of the maxillary central incisors and the rational procedure to follow.

In describing the vestibule of the mouth, Blair and Ivy refer to the frenum as a fold (which connects the upper lip with the gum) which may preserve its infantile arrangement of remaining attached to the incisive or palative papilla, causing separation of the two central incisors.

Strang explains that this fibrous tissue may become elongated at its alveolar end, extending lingually between the central incisors, cutting through the proximal fibers of the peridental membrane, and ending in the central papilla of the rugae of the hard palate. He recommends the destruction of this tissue by cautery just at the instance of the eruption of the permanent central incisors.

McCoy states that at birth this structure is attached from the lip to the gingival border, and that as the teeth and arches develop, the alveolus lengthens, leaving the frenum at its normal or high level of attachment. When abnormally attached this does not occur, and the fibers attached to the palatal mucosa must grow with the surrounding structure, thus establishing a mechanical influence to keep the teeth separated.

In the *Year Book of Dentistry*, 1936, the following statement appears:

"Mershon in 1925 stated that in all cases permanent centrals erupt separated but in time come together. There are a few cases in which this does not occur, but one has only to recall the smaller number of adults with separated centrals to realize how rare such cases are. There have been fewer operations for the removal of the frenum since Mershon pointed out that when the centrals erupt they are separated."

In a paper entitled, "Some Factors in the Diagnosis of Malocclusion," Lewis refers to the frenum as follows:

"Now let us consider another problem, that of the upper labial frenum. We have heard much about this condition and its effect upon the dentition. When abnormal it produces a rather disfiguring deformity. But the question is, when is it normal? Recently there has been a wave of frenum removals by orthodontists and pedodontists. The diagnosis is made on the basis of the appearance of a diastema between the upper central incisors and the position of the attachment of the frenum. The wave is gradually subsiding, I am happy to report.

". . . models and intraoral roentgenograms have given us much insight into this problem. The permanent central incisors lie within the maxilla, separated by the intermaxillary suture. When they break through the bone they are necessarily separated from each other by varying degrees. For a period during eruption the frenum appears to be attached too low on the mucous covering of the maxilla. But while the incisors are erupting the face is growing in height, owing to an increment of bone and the eruption of the teeth. As this growth occurs, adjustments take place, and in the large majority of cases the diastema closes and the attachment of the frenum assumes a higher position. I have seen diastemae of as much as 5 mm. at seven years of age entirely close when the lateral incisors had erupted. . . .

"True, some of these spaces never close, and sometimes the frenums are abnormal and should be removed. However, in the light of our findings the diagnosis of abnormal labial frenum should never be based on one examination showing a diastema and a low attachment of the frenum. The case should be observed until natural growth processes show the frenum to be unquestionably abnormal in its development."

As a result of his research he states that 3 per cent or less of frenums should eventually be harmlessly removed, and from my own clinical observations I believe this relative proportion to be correct.

Anderson, in the revised edition of *Practical Orthodontia* (by Dewey) and in subsequent writings, has covered the subject in a manner characteristic of the thoroughness of all his work. His preparation of photomicrographs of histologic sections, research in prenatal, newborn and infant palates has been sufficient to establish the facts. His studies of mouths from infant to adult have covered the growth cycle of the frenum, both normal and abnormal. He has shown what influence the range of conditions found may exert on the teeth and surrounding tissues, and recognizes the necessity of removal in a small percentage of cases. He also describes the operation which Dr. Parker has pointed out today. He states as follows:

"Why shouldn't the frenum develop abnormally, why should it not be unusual in form and function? Every other organ of the body is subject to variation, so is the frenum."

In the Forum of the INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN edited by Dr. Albert H. Ketcham, the following abstracts of opinions were collected and published:

Ketcham: Move central incisors together first, then remove appliances for slight relapse. Excise frenum by cautery and reinsert appliances immediately to gain advantage of scar tissue to hold teeth together. Only operate in extreme cases or after relapse. Very conservative.

Mershon: Very conservative. Advocates, or prefers at least, no operations.

Johnson: Very rational, opposed to cautery. Does not think the frenum is a cause for spacing of the teeth.

Howard: Opposed to operation.

Dewey: Advised removal of all abnormal frenums, but did not define them.

Barnes: Condemns cautery as being as bad as, or worse than, frenum. Diagnoses as abnormal when movement occurs and tissues blanch between central incisors and palate. Advises surgical removal.

In a paper on studies on the frenum, Schwartz and Abbott make the following report: In one group of 116 children between the ages of three and six years inclusive, 26 could be called abnormal. Of that number 15 had separated central incisors and in 11 the central incisors were unerupted. In the next group of 128 children between the ages of nine and thirteen years inclusive, eight had abnormal frenums. In the next group of 62 children ranged in the middle teens, only three had what might be called abnormal frena. They referred to the variations found in frena as "an embryological factor in the closure of the face."

While this is no place to treat of the subject, it is a well-known fact that the range of variation in the relation of all of the structures comprising the face can make many accountments for spacing between maxillary central incisors as well as any other of the teeth. Separation of the teeth has been traced to hyperpituitarism—a source of constitutional origin.

Apparently the frena (superior and inferior) have little or no known functions in adult life. It is interesting to note the presence and performance of the frena in the newborn or infant mouth. One is almost led to suspect that they perform a very important part in the control of the lips and their necessary functions in the infant period, gradually receding into a state of disuse in the adult under normal conditions.

CONCLUSIONS

1. Thickening of the tissues involving the frenum is normal in infancy, and should become less as the child grows older.

2. There is insufficient evidence that so-called enlarged frena have any relation to most separated central incisors.

3. The eruption of all permanent teeth should be awaited, at least up to and including the second molars.

4. If operation is indicated, beware of the dangers of scar tissue and the destruction of normal tissue.

It seems to me that with this sane and logical presentation which Dr. Parker has so ably given us, and with these few observations, there is little excuse for any one straying beyond the rational range today, and, as in all things, one must be alert to give nature the benefit of the doubt.

An expression which is axiomatic to me is, "He who endeavors to do the least amount of harm generally accomplishes the greatest amount of good."

It has indeed been a pleasure to have the privilege of discussing Dr. Parker's paper. Whether in consultation, making a diagnosis, watching him operate, or in the discussion of scientific principles, I have always found him to be as sound, rational, and thorough as he has been in the purport of his paper today. Dr. Parker has many friends among us, and is far from unknown to all of you, and in thanking him may I say that it is men of his type and caliber that we need to assist us in problems of this kind wherever our fields converge.

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Dr. William H. Gilpatric.—I would like to ask Dr. Parker a question. He referred to the suture. It has been my observation in a great many of these abnormal frena—I will confine it to the abnormal frena and not to the average case—the width of the bony structure between those two central incisors is very striking. Particularly have I noticed this in the case of children, ten or twelve years of age, and also in adults, possibly the mother or father. I have noticed this particularly in making x-ray films of the adult and finding that very wide spacing of the central incisors; and it has been striking the amount of hard bony tissue between the central roots. I would like to ask Dr. Parker if he has made any observations along that line. If so, has he drawn any conclusion that it may possibly be the bony tissue that has a great deal to do with it rather than the soft tissue in some of these abnormal cases, with extreme abnormality?

Dr. Parker.—We find many times from a developmental standpoint that the suture may be wide open, but I think we have to consider that the alveolar bone is a transitory structure. It develops with the developing tooth. It is lost after the loss of those teeth. With that idea in view, if the central incisors are abnormally placed, and as they develop upward, the alveolus develops more or less with them and there would be bone between those teeth.

As far as the suture is concerned, in making x-ray films of the teeth in which there is a wide space between the central incisors, and in which the frenum—I am speaking particularly of the frenal attachment—is low, we do not necessarily find the suture spread apart or widened. It may be widened, and still the frenum may be attached high up, not an abnormal frenum. I do not think there is a definite relationship between the low attachment of the frenum and the wide space between the suture, that is what I have in mind.

In cleft palate cases, where there is a lack of development in the union of the premaxilla, we find that the cleft is rarely in the midline. It is usually considerably to the right or left of the midline; but we do find that the frenum may be attached almost on the palatal side in those cases, and if they had been united we probably would have had a low attachment of the frenum in such cases.

I do not know whether I answered your question as to the separation of the sutures. I am thinking of it in relation to abnormal frena.

Dr. Gilpatric.—Perhaps I was a little indefinite on that. I will admit that is true on the alveolar process itself, but I had reference to higher up in the palatal bone, that about the palatal bone where the suture is closed there is an abnormal amount of tissue in there between that and the roots of the central incisors.

Dr. Parker.—It is hard to say sometimes which comes first. In this case whether the fact that those teeth developed apart was due to the fact that bone formed in between them, or whether bone formed in between them because the teeth were apart, I do not know. I think that is rather a hard thing to answer sometimes, unless you have made a great many sections histologically during the developmental stage before the eruption of the permanent incisor teeth. I do not know which antedates the other in that respect.

Department of Orthodontic Abstracts and Reviews

Edited by

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A Textbook of Clinical Periodontia. Paul R. Stillman and John Oppie McCall with a chapter on Normal and Abnormal Occlusal Relations by Egon Neustadt, second ed., 2 New York, 1937, The Macmillan Co.

In 1922, Stillman and McCall produced the first textbook on the modern practice of periodontia. In this, they incorporated ideas on occlusion and philosophy of periodontal treatment which were far ahead of their time. Yet, because of the rapid progress made in this field, after only a few years the authors themselves discouraged the use of this book as antiquated. The interim during which no revision was made of the text, caused a breach which was felt most keenly by those interested in the teaching of this subject. Now, at last, these authorities have undertaken to completely revise their book, bringing it up to date. For Stillman and McCall, this means bringing it into the realm of the future.

The first four chapters discuss the philosophy of dentistry and give adequate reasons, because of dentistry's background, for the past erroneous approach to treatment. The authors stress the point that interest should center not on fighting disease but rather on promoting tissue health. In this way "the periodontist . . . . must particularly apply himself to a comprehension of biologic law." The importance of local function is stressed and a knowledge of physiologic variations is placed paramount, with pathology relegated to the background. In Chapter V the reader is given simple, clear definitions of terms commonly used in discussions of periodontal conditions with adequate descriptions whenever needed. As many of these terms were originally coined by the authors themselves to express their own ideas, the chapter is, to say the least, authoritative. This terminology has been accepted by the Committee on Nomenclature of the American Academy of Periodontology.

The histology, physiology and pathology of the periodontal tissues are discussed in five interesting chapters. The chapter on physiology is of especial interest to the practicing dentist, since it treats the subject from the practical approach.

Great stress is laid upon the importance of normal function. The corelation between function and resistance demonstrates that function is a means of increasing the tissue tone, and the increased tissue tone brings about a state of high resistance. Lack of tone goes hand in hand with low resistance (as in cases of non-occlusion). The tissue tone may be increased not only by function but also by stimulation of blood supply, proving that tone is closely linked

with the condition of local blood supply. An effective agency to activate blood supply of the periodontium is the toothbrush, especially at a time when the dietary of most people provides only slight exercise for the teeth. Normal function is possible only if an accurate adjustment of the teeth in maxilla and mandible exists. The requirements for this are: that all the teeth be present; that they be in good alignment; and that there be a correct interdigitation of their cusps. Minor variations in the form of individual teeth and changes in functional demands are met by a constant modification of tooth form, accomplished by progressive wear. Continuous eruption and occlusal elevation play a part in this process of adaptation.

Of special interest to the orthodontist is the following description: "The function of the teeth in mastication is subserved by the combined function of three tissues, the pericementum, the alveolar process and the gingiva, together with the action of the several sets of muscles which control the movements of the mandible. When the teeth are properly used in mastication, they move slightly in their alveoli due to the elasticity of the pericementum, causing compression and stretching of the fibers. There is also a certain amount of compression of the cemental gingiva. The normal exercise of these tissues thus produces a stimulation of the blood supply which provides for them their chief barrier against infection, as well as their source of nourishment. Stimulation of the blood supply to the gingival tissue is more directly accomplished by the pressure of food passing over it, during the act of mastication. This stimulation may be artificially produced by the use of the toothbrush, its influence extending even to the deeper structures. Normal function provides for the health and also the development of the periodontal tissues. It is a matter of common observation to investigators that the bulk of the bony tissue of these parts is greatest in those races who make the most vigorous use of their teeth. Ability on the part of the alveolar structure to withstand the strain imposed by mastication demands a certain strength and bulk of these tissues, a quality conferred by the exercise of the very function whose stress they must withstand."

The subject of etiology is given its due with an entire section devoted to it. Since McCall, working with Stillman and Box, is responsible for the development of an etiologic chart which is of worldwide use and has been quoted in many textbooks, and since the fundamental success in treating any pathologic process depends on the removal of its cause, the reader will find himself amply repaid by a careful study of this section.

Another complete section is devoted to functional incoordinations, and the source, detection and correction of traumatic occlusion are thoroughly discussed. Among the mechanical irritations which produce periodontal disease, are listed:

1. Malocclusion.
2. Restorative defects.
3. Abnormal tooth form.
4. Habits of occlusion.
5. Orthodontic trauma.

This latter is caused by the use of excessive force; it is well to quote the authors on the incidence of traumatic occlusion. "Traumatic occlusion is an abnormal occlusal stress which is capable of producing or has produced an injury to the dental or periodontal tissues. It is essentially a stress in excess of the normal, or, in other words, it is plus-occlusion. Plus-occlusion may occur simply as the expression of excessive stress from an opposing tooth; but it may also occur through a shortcoming in the alveolar support of the tooth involved, the stress itself being normal. This structural deficiency may be the result of disease, but more commonly seems to be due to dietary deficiencies in early life. Excess stress may be imposed on one or on several teeth. When a condition of plus-occlusion is found to be present, one of two things will occur: either nature will provide an increased alveolar support, a condition revealed in the radiograph as a condensation, or there will occur a breaking down of the supporting tissues or even of the dental tissues. Unfortunately, the tendencies of civilization are toward more frail alveolar structures, the consequence being a corresponding tendency toward a condition in which even normal stresses produce trauma."

The equilibration of occlusion and correction of traumatic occlusion is accomplished by three methods: orthodontic treatment, odontoplastic or prosthetic operations, and the remodelling of occlusal surfaces by grinding. Orthodontic treatment represents the ideal method of adjustment, although it must often be followed by grinding for the remodeling of incoordinate cusps.

Diagnosis, prognosis and types of treatment are included in this concise volume. Although the authors are primarily of the "conservative school" and this rationale is stressed, descriptions are given of the modified Rubicek, Kirkland and Ward operations. The technique for the use of McCall's epithelial solvent in enhancing pocket closure is described in detail. Vincent's infection, the use of steel instruments, splints, preventive dentistry, and proper home care, including the Stillman method of gingival massage, are included in the scope of this text.

Special mention must be made of a chapter by Egon Neustadt on "Normal and Abnormal Occlusal Relations," which will be found of particular value to the periodontist as well as to the orthodontist. Going back to an early definition of normal occlusion by Angle, Neustadt discusses: the requirements for occlusal coordination in centric and eccentric positions; continuous tooth eruption; continuous occlusal tooth elevation which is the source of all disturbances of the plane of occlusion, such as excessive overbite, edge-to-edge bite, reversed overbite, and non-occlusion. Several factors are also mentioned which must be taken in consideration during orthodontic tooth movement in order to avoid injury to the periodontal tissues.

This textbook will prove a most valuable source of information to the dentist in his every day practice, to the specialist in periodontia, and to the orthodontist who is interested not only in moving teeth, but in moving them in health, and into health.

The style of the book is excellent. The type is clear and easily readable. A specially made English finish paper is used in this text to facilitate readability in artificial light.

Samuel Charles Miller.

The American Illustrated Medical Dictionary. W. A. Newman Dorland, with the collaboration of E. C. L. Miller, 1937, Philadelphia and London, W. B. Saunders Co.

The dictionary provides unusually clear definitions; besides its etiology, it gives the pronounciation of every word and tells when to capitalize. Under the diseases, an account of etiology, signs and diagnostic symptoms is given; under the organs, a description of their structure and function, in many instances with illustrations; under the drugs, data of their composition, sources and properties are found. Dental terms are very complete (but the standard dental chart with tooth numbers is missing).

A valuable feature of the book is its tables: anatomic tables describing arteries, veins, muscles, and nerves; diagrams of the nervous system; a table of tests, containing all important chemical, biological and functional reactions; methods of examination; table of stains and staining methods for histopathologic techniques; table of the chemical elements with their atomic weights, specific gravity, etc.; types of growth in cultures; weights and measures in the metric, apothecaries, and avoirdupois system; and a most complete "Posologic [that's where you need the dictionary] and Therapeutic Table of Medicines" with their doses, actions, and uses.

If a book of this type has had seventeen successful editions, it is not necessary to say much in its praise. It is sufficient to announce a new printing and, at this occasion, to call it to the attention of those men who possibly do not know of its existence. The original edition in 1900 contained 770 pages, the present one 1,573, with 945 illustrations.

The format of the dictionary is practical, the paper thin but strong, the print clear. It has a thumb index which makes for ease of handling.

Egon Neustadt.

Department of Oral Surgery Abstracts and Reviews

Edited by

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Cellulitis of the Neck Requiring Tracheotomy, Gordon B. New, Surg. Gynec. Obst. **65**: 536, 1937.

Five cases of cellulitis of the neck are described in which it was necessary to perform tracheotomy on account of obstruction of the upper part of the respiratory tract. In such cases tracheotomy should be performed early. Drainage of the phlegmon generally causes the edema of the pharynx and larynx to subside, but if the edema is progressive and there is no fluctuation in the neck to suggest where the diffuse cellulitis is localizing, an early tracheotomy is advised. Irradiation is of definite value in the treatment of certain infections of the neck.

If drainage has to be performed, New recommends the use of intravenous administration of pentothal sodium except in cases with partial obstruction of the respiratory tract when a spray of ethyl chloride is employed, as there is danger of complete obstruction if general anesthesia is used, which would necessitate an emergency tracheotomy. To establish drainage a small incision is made in the skin over the point where the phlegmon is becoming localized, a curved hemostat is passed into the pockets and spread, and a fairly stiff cigaret drainage tube is inserted and sutured to the skin with silk.

Topography of Incisions for Phlegmons of the Jaw, With a Few Therapeutic Remarks (Zur Topographie und Schnittführung bei Kieferphlegmonen nebst einigen Bemerkungen zur Therapie derselben). Antoni Cieszyński, Ztschr. f. Stomatol. **35**: 32, 1937.

The writer describes the following inflammatory conditions: suppuration in the submental area, in the muscles of the tongue, the sublingual tissue, the submandibular area, and spreading by continuity in various directions. He indicates by means of drawings the best place for incisions to drain the various spaces. From the incisions arrows point the direction in which the hemostat should be introduced and the drain inserted. The incisions should prevent disfiguring scars and avoid blood vessels and nerves. The submental incision should be in the midline vertical to the chin. For submandibular abscess the incision should be parallel to the mandibular border, either anterior or posterior to the external maxillary artery. On the neck the incisions should be parallel with and anterior to the sternomastoid muscle.

Surgical Treatment of Acute Periodontitis (Die chirurgische Behandlung der akuten Wurzelhautentzündung). Rob. Neumann, Zahnärtztl. Rdsch. **44**: 226, 1935.

This article discusses the pros and cons of extraction in the presence of acute periodontal infection. The writer believes in immediate extraction of the tooth to establish drainage, and has never seen any serious results or cases resulting in death from such treatment.

Inflammatory Complications Accompanying the Eruption of the Mandibular Third Molar (Entzündliche Komplikationen beim Durchbruch des unteren Weishetszahnes). P. Schmuziger, Deutsche Ztschr. f. Chir. **244**: 259, 1935.

The complications of "dentitio difficilis" of the mandibular third molor occur not when the tooth perforates the surface of the bone but when reaching the soft tissue. In mild cases drainage of the pockets formed by the overlying gingiva, or excision of the gingival flap, or extraction of the tooth will relieve the condition. In neglected cases the infection may spread to the masseter muscle and cheek, and may end in cellulitis of the neck, or may cause pharyngeal abscesses, and may even involve the mediastinum. Early incision and drainage are important in these cases.

Fate of the Permanent Tooth Germs in Osteomyelitis During Childhood (Über das Schicksal der Keime der bleibenden Zähne bei der Kieferosteomyelitis im Kindesalter). Hans Pflüger, Deutsche Zahn, Mund. und Kieferheilk. **4**: 517, 1937.

According to the observations of the writer conservative treatment of osteomyelitis is of great importance in children in order to prevent exfoliation of the permanent tooth germs. Complications, however, may set in which make more radical intervention imperative, and often it is necessary to disregard the fate of the teeth in order to save the child's life. The choice of treatment is based on experience and on exact knowledge of the alarming symptoms.

The Use of Sulfanilamide in Postoperative Acute Cellulitis. Howard R. Raper and J. G. Manser, Dent. Digest **43**: 434, 1937.

Sulfanilamide (para-amino-benzene-sulfonamide), like prontosil used for over two years, has been used successfully in cases of septic sore throat, puerperal fever, meningococcic meningitis, erysipelas, gonorrhea, pneumonia, scarlet fever, brain abscesses, etc. The writers are reporting its use in a case of swelling about the face and submaxillary region, dysphagia and fever, following the extraction of the left mandibular third molar three days previously. The condition yielded to the administration of sulfanilamide (ten grains every four hours for eight doses, and five grains every four hours for nine doses—total 125 grains in 68 hours), applications of hot packs at intervals for three days, daily irrigation of socket. The infection was caused by *Streptococcus viridans* accompanied by *Staphylococcus aureus.* Blood culture was negative. The writers discuss possible toxic effects (transient anemia and agranulocytosis).

Surgical Treatment of Mandibular Prognathism (Die chirurgische Behandlung des progen gelagerten Unterkiefers im bleibenden Gehiss). Aloys Trumenkamp, Dtsch. Zahn. Mund und Kieferhlk. **4**: 528, 1937.

The surgical method is indicated especially in cases in which the deformity is due to micrognathia of the maxilla. In childhood this condition is difficult to treat by orthodontic measures and generally results in underdevelopment of the middle face. The deformity can be corrected by shortening the mandible. Various operative methods have been suggested since Hullihen in 1849 performed the first osteotomy on the horizontal ramus of the mandible. The writer prefers the operation performed in the ascending ramus. The osteotomy is performed by means of a stab saw, dividing the bone between the mandibular foramen and the sigmoid notch, about three-quarters of a centimeter under the latter. The writer lays great emphasis on a careful orthodontic study, to be undertaken before the operation, in order to locate and place bands to facilitate correct placement and retention of the jaw by means of intermaxillary ligation until the bone has reunited.

Treatment by Injection for Subluxation of the Mandibular Joint. Louis W. Schultz, J. A. M. A. **109**: 1032, 1937.

The frequent type of chronic subluxation of the mandible caused by congenital weakness of the capsule, malformation of the condyle, strain or injury to the joint under general anesthesia, yawning, malocclusion, etc., has been effectively treated by the writer through the injection of sodium psylliate, 0.25 to 0.5 c.c. into the affected joint. Schultz gives conclusions drawn from animal experiments and describes the result in 30 patients treated by this method. Sodium psylliate causes a fibrosis of the joint which persists long enough to restore it to normal function.

Treatment of Malignant Tumors of the Maxillae (Traitement des Tumeurs malignes des maxillaires). C. Tuillard. Presse Dent. **36**: 512, 1934; **37**: 21, 1935.

Tuillard points out that surgical treatment is difficult, as it is not possible to operate in the normal tissue by a wide margin; therefore operations should always be followed by irradiation with x-ray or radium. In cases of osteogenic sarcoma x-ray radiation is favored, as these tumors are radiosensitive. This treatment is more successful in the mandible; in the maxilla excision is recommended followed by irradiation therapy.

Investigation of the Inheritance of Harelip and Cleft Palate (Untersuchungen über die Vererbung der Hasenscharte und Gaumenspalte, mit besanderer Berücksichtigung des Erbganges). C. H. Schröder, Arch. Klin. Chir. **182**: 299, 1935.

Of seventy-five cases at the surgical clinic in Münster (1932-34) hereditary factors were found in 42.7 per cent. In eight cases the hereditary factor was dominant, in twenty-four it was recessive; 40.5 per cent of the children of

affected parents were afflicted, and 22 per cent of the parents were normal but other relatives were involved. In 5.3 per cent of the cases there was a blood relation between the parents.

Congenital and Acquired Defects and Deformities of the Face and Jaws. A Review of the Literature. Robert H. Ivy, Surg. Gynec. Obst. **64**: 433. 1936.

Ivy reviews the literature for 1936 on cleft lip and palate, acquired deformities, defects of eyelids and ears, and deformities and malrelations of the jaws. It is a very interesting article describing the latest methods of treatment at home and abroad.

Editorials

The New York Society of Orthodontists and Public Information

THE New York Society of Orthodontists in order to extend orthodontic education and public information on orthodontics has appointed a Committee on Public Information. Recently a booklet has been published entitled *The Purpose of Orthodontics,* sponsored by this committee with headquarters at Room 22, 2 East 103rd Street, New York, N. Y. The pamphlet is copyrighted by the New York Society of Orthodontists. Its contents will be of great interest to the profession. On account of the interest manifested in the subject of public information on orthodontics and on account of the recent discussions pertaining to this subject, particularly as it ties in with the activities of the Committee on Socio-Economics of the American Society of Orthodontists, the INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY herewith publishes in full the contents of this pamphlet.

H. C. P.

The Purpose of Orthodontics

It is our concern, in seeking to solve health problems, as well as those which are social or economic, to fit the various serviceable units of our complicated civilization into such relationship that each may perform its function best, and interfere least with the operation of the other parts. To give men a proper perspective so that they do not presume to do, through zeal or greed, what they are not qualified to do, and to allow them to perform that for which they are suited to the limit of their capacities, is the crux of many of the serious questions of the day, though they masquerade as problems of quite a different sort. Industries have been bankrupt, personal fortunes smashed, lives ship-wrecked and nations brought to dust, because it was believed that an individual fitted by training to do one thing pre-eminently well could do other things equally well in which he possessed no experience.

The orthodontist is seeking answers to a multitude of questions. The realm of the unknown and the unknowable is still too imperfectly defined. But through professional organizations of repute he is approaching these questions in a basically sound way, and his insistence on the highest qualifications for the practice of his specialty, condemning shortcuts, is born of an honest conviction that the last place in our society where experimentation should be permitted is with the health and well-being of children.

What is the relationship of orthodontics to pediatrics? To medicine as a whole? To dentistry? Is it really a specialty? Can it safely be practiced without special training and experience? How are the qualifications to practice it acquired? These questions are pertinent to the well-being of countless

children; they affect the quality of care given by the family doctor, the pediatrician, the dentist. In an effort to answer them more or less adequately, this document has been prepared by the New York Society of Orthodontists.

Louis Fischer, M.D., of New York City, urges better teamwork between the orthodontist and the pediatrician, and, if this be true, how much more necessary it is between the orthodontist and the dentist! "Is it not a fact," asks Dr. Fischer,* "that the child sees the orthodontist after there is a malocclusion or after there is marked deformity in the mouth resulting from abnormal metabolism and after the real systemic damage is done?

"The orthodontist is probably in the most favorable position to be of especial help to the child and its parents, because his cooperation in noticing any symptoms of disease in the oral cavity and reporting them will entitle him to lifelong esteem on the part of the family. The pediatrician, as well, will look upon him as something more than a tooth regulator. Modern science has given us so many avenues of attack in dealing with these infectious diseases of childhood that our problem is chiefly one of getting the child under treatment as early as possible. Many lives will be saved in years to come by the ability of dentists to observe the oral manifestations of disease and by their reporting them immediately.

"The obligation of the physician to the orthodontist, in my opinion, commences in the earliest stages of a baby's existence. Naturally, we do not know which babies will need orthodontia and which ones will receive it, but if the factors which tend to stimulate the normal healthy growth of bones and teeth are conscientiously observed, the pediatrician is doing his share toward cooperating with the orthodontist."

In the discussion of Dr. Fischer's paper, the following comment was made by Dr. J. M. Lewis of New York City: "There is no doubt, as Dr. Fischer has emphasized, that closer cooperation should exist between the pediatrist and the orthodontist, because we pediatricians see cases of malocclusion in their very earliest stages, and then are in a position to recommend the child to the orthodontist to receive adequate and proper treatment. Unfortunately though, many of us know little about malocclusion. Dr. Fischer emphasized various medical conditions in the mouth which should be recognized by the orthodontist. Conversely, pediatricians and physicians should be more informed about the various types of malocclusion. Medical students do not receive any instruction concerning disorders of dentition and orthodontia, and it might be well that a course in the various dental disorders be made part of the medical curriculum, so that we physicians might readily recognize them and thereby more closely cooperate with the dentist and orthodontist.

"Closer cooperation might be worthwhile too in carrying out investigations in regard to the causes of malocclusion. So far as I know, although there have been many factors ascribed, their relative importance has not as yet been generally agreed upon in regard to malocclusion."

If the physician and the pediatrician are aware of the point at which their skills cease to be called for and those of the orthodontist should be requisi-

*Fischer, Louis: The Interrelationship Between Orthodontia and Pediatrics, INT. J. ORTHO., May, 1934.

tioned, is the general practitioner of dentistry similarly aware? This point immediately brings up the real question concerning which there has been some recent controversy: Whether the dentist is capable, or can easily be made capable to do for the patients who come to his office, the orthodontic work which he finds ought to be done. It is argued that orthodontics is dentistry, and should be practiced by the dentist; that there is so much orthodontic work needed to be done that it should be performed by the general practitioner; that the services of the qualified specialist are expensive and unnecessary. Short courses have been offered by private individuals, apparently providing an easy way to surmount the difficulties which must be overcome by those in search of true orthodontic training in the established dental educational institutions. These quickly-trained men (often equipped with little more than a piece of patented apparatus) are to do the work to meet the growing demand for orthodontic treatment. When we examine closely how this demand came to grow and learn that it was created by the well-trained and conscientious specialist who has spent many years of his life equipping himself to be competent, it is easy to see that the demand will not continue to exist long, if it is to be met by poorly qualified men. Furthermore, the demand for the services of the more skillful will without doubt be affected by the bad reputation given to this entire branch of the healing art.

It is not claimed here that the general practitioner should not do any orthodontic work. It is merely contended that if he does do it, he should be adequately prepared to deliver the service he represents himself as able to perform. This ability will not be acquired in a short course at a proprietary school conducted for profit—the type of institution that was a stench in the nostrils of the medical profession during the Nineteenth Century. The organized medical profession had a long and successful struggle to regulate their institutions of learning so that the first concern would actually be medical education. By the same token, orthodontic education cannot escape having its own "growing pains."

Orthodontics, though primarily concerned with growth and function, is far more an art than it is a science. For this reason, little practically useful knowledge of it can be gained from books. Theory and practice must go hand-in-hand; language is inadequate to convey the significance of life processes which are felt rather than seen. But much light can be thrown by an examination of the literature so far as our present point here is involved; namely, what constitutes orthodontic competence. The training which qualifies for the practice of orthodontics must result in an understanding of the principles of growth and development of the denture and the correlation of these principles at all stages in the treatment of cases.

J. V. Mershon,* D.D.S., Sc.D., of Philadelphia, says in "Facial Changes": "To the lay mind, orthodontia is the straightening of crooked teeth. As a matter of fact, our problem is not a tooth problem at all, it is a growth problem. In handling it in treatment, it is necessary to carry it on in the same manner that a physician or a surgeon would treat delicate, growing, develop-

*Mershon, J. V.: The Human Face, Dental Cosmos, p. 113, 1935.

ing tissues. The idea that men can start the treatment on these children's teeth when growth has carried them to a position which we, as orthodontists, think is wrong for them, and undertake to put them in another position where our understanding makes us think they belong, at our will, is wrong. Treatment must be taken up in steps and stages. We must keep pace with the various stages in growth and development of the jaws and mandible and maxilla. The time to start treatment differs with each individual.

"We have said that facial deformities are the result of growth gone wrong, which expresses itself in malpositions of the teeth resulting from a deformity in the alveolar process. The teeth can occupy *only* such positions as the alveolar process, in its development, carries them to. On the other hand, we change the shape of the alveolar process by means of the teeth, for they must serve as the *agent* through which stimulation is applied. Stimulation applied to the teeth is passed on to the alveolar process. When this stimulation is properly directed, it guides the alveolar process back to normal and, as this bone develops toward the ideal, it carries the teeth to their correct functional relationship. Thus we see the interdependence of the teeth and the alveolar process with the whole structure of the face."

Touching directly on the issues we have raised at the beginning of this document, it seems desirable to quote from Harry E. Kelsey,* D.D.S., F.A.C.D., of Baltimore: "Coincident with this study and investigation in the field of materials and appliances has been the more baffling and probably more important research in the sciences, with the hope of securing information which would enable us to evolve a practical etiology which might intelligently guide us in diagnosing our cases, and, of course, in their treatment. It is a large field and one in which only a trained investigator may hope to accomplish anything. Out of a hundred guesses, one may be right; but, if by good luck we adopt that one and success attends our efforts, we are as much in the dark as ever, not knowing why we were right. Thanks to the tireless efforts of many able men with a natural gift for research, which has been fostered by study and adequate preparation, much has been accomplished, and I do not believe that anyone will contradict the statement that we are better equipped to attack the problems of malocclusion than were the pioneers of several decades ago. The men who have been carrying on research in the field of growth and development in the human body, and especially in our own particular field, refuse to be beaten and are being joined by an increasing number of recruits from among the younger men who can now more readily acquire the necessary background and preparation for scientific research, and *I believe the time will come when orthodontists will be able to distinguish between those cases which are capable of being successfully treated along ideal lines, and those which through heredity or environmental conditions do not offer the same possibilities.*

"But are we taking account of the trend in orthodontic practice and development outside of our familiar and well-known professional environment,

*Kelsey, Harry E.: Trends in Orthodontia, INT. J. ORTHO., February, 1937.

and (I might add) sometimes within it? I might answer my own question by saying that we have sometimes noted and endeavored to correct, and, too, with some success, certain abuses which, if not checked, would certainly have a degenerating influence upon orthodontia as a specialty, particularly in the eyes of the laity and kindred professions. For example, we have been fairly alert in trying to suppress misleading advertisements by those who are unqualified to give the service which they promise. I refer to those laboratories and technicians who have thriven upon the patronage accorded them by members of the profession and, after becoming prosperous through doing that part of our work which they were qualified to do, *they have in many instances conceived the idea that the whole of orthodontia lay in the construction of appliances.* Having made a great many under the direction of well-known orthodontists for the various types of malocclusion, they have felt that they could not only make, but also sell these appliances to dentists who had the legal right to practice orthodontia but actually did not have sufficient knowledge of it to construct their appliances, to say nothing of properly inserting them in the mouth and adjusting them during treatment, or what is of still greater importance, to analyze and diagnose their cases intelligently. Fortunately, through the representations of organized orthodontia, there are fewer of these advertisements appearing in the journals at present. It is unquestionably the duty of the profession to regulate matters of this kind. The laboratory is to be looked upon more in the nature of a business; and we, not they, should be blamed if business ethics are permitted to supplant professional ethics in our specialty.

"The general practitioner, who was in a position to inveigle some of his patrons into trusting their children in his hands for orthodontic treatment, may have experienced at the outset a slight enhancement of his income, but eventually his experience was that which has characterized similar experiments over a period of the last thirty years, during which orthodontia has developed as a specialty; namely, that for a short time he found he could have appliances constructed and, in one way or another, insert them into the mouths of his patients; but when it came to treatment, from one to three years was usually sufficient to convince him that he was only making trouble for himself. While a few of these men may have given sufficient study and thought to their cases to get something in the way of results at the outset, most of them found themselves with a dozen or so cases which would not progress and often were getting worse. In many instances they went to laboratories and had appliances constructed upon models of cases and then placed them in the mouth with the hope that something would happen. In one such instance that I have recently heard of, a dentist said that he had placed the most modern up-to-date appliance which the laboratory could devise and construct, in the mouth of a patient, who wore it a year, and so far as he could judge no change had been brought about. The case, he thought, was just as it had been when he inserted the appliance. Such an admission seems incredible on the part of a man who is, or should be, familiar with the structures of the mouth, and to some extent at least with the laws of mechanics. It is possible, however, that

he did less harm than others who at least knew that manipulation and adjustment of appliances were a part of orthodontic procedure, and in the end left some of their patients worse off possibly than when they started.

"As the laity has become more aware of the advantages of good orthodontic service, the demand for it has naturally increased, and those who would take advantage of this demand have not been slow to see the possibilities it offers. There have been some who have sought to establish themselves, and in some instances have succeeded quite notably, as consultants, who would design appliances for the general practitioner and advise him with regard to the conduct of orthodontic cases which he might undertake. In some instances, it has been adopted as a means for exploiting a special type of appliance which may or may not be patented, but which is usually manufactured and advertised as ready to be placed in the mouth with little or no alteration. As I stated earlier in this paper, most of these appliances in the hands of a skillful and experienced orthodontist may be used to secure excellent results, but neither the appliance itself, nor the fancy package in which it is put up, will enable one without experience to treat cases of orthodontia successfully.

"In spite of all that I have said, however, I do not wish to be understood as condemning the general practitioner who conscientiously prepares himself for orthodontic practice and thereafter engages in it, and I applaud those who, in a rural community in which there are patients who cannot reach a specialist, have a high enough sense of duty to prepare themselves properly to give orthodontic service to as many as they can find time for. My only contention is that those men are not justified who, located where orthodontic specialists are available, attempt to cover this field without at least as much preparation as an assistant who devotes all his time to orthodontia under the direction of an experienced man or, in lieu of that, devotes at least a year to postgraduate study in some institution in which he can receive intensive training. Orthodontists will undoubtedly be accused of self-interest when they condemn general practitioners who undertake the treatment of orthodontic cases without due preparation; nevertheless I believe it is true that the highest type of men in this specialty really have in mind the welfare of the patient and the public generally and are not thinking whether or not their incomes will suffer."

It has been stated that there are not enough orthodontists to care for all the children needing orthodontic treatment. The same claim may be made in every branch of the healing art. More people need medical care than get it; and the same may be said for general dentistry. Because there are not enough trained orthodontists to take care of *all* the children who ideally should be treated, must we relax our standards to admit the general practitioner who has not specially qualified himself? The training and experience are to be made his own if he will make the sacrifice to obtain them. As more men are qualified to do good orthodontic work, the demand increases through public knowledge of benefits derived, in turn more orthodontists appear to be needed and a greater number of young men are attracted toward the specialty. This

is healthful growth and function economically and socially, corresponding in principle to the forces with which the trained orthodontist works in the practice of his specialty. It is slow. It is sure. It is sound.

The general practitioner should be encouraged to learn all he can of this specialty. Nobody will deny him the privilege of practicing it after he has properly qualified himself. The New York Society of Orthodontists does not oppose the education of the dentist in this regard. It does oppose the substitution of mere acquaintance with the subject matter for that skill which requires years of devoted effort to acquire.

Those men in the orthodontic profession who are zealously upholding its standards, muster in their behalf many more distinguished men in the professions of the healing arts than have been quoted in this brief presentation of the subject. In view of the array of testimony it is difficult to view with equanimity the recent statement that "Orthodontia is easy." It is easy only for those who take it easy. Is it equally easy for the patients and the disappointed parents?

Orthodontics is not easy. It is difficult. The imponderables involved call for a high order of ability. The advancement of this profession, whose future means so much to the health, personality development and well-being of the children of the future must not be allowed to rest in the hands of men with the commercial laboratory viewpoint, who, for personal reasons, tempt the general practitioner of dentistry to use appliances of their manufacture under their guidance. Advancement must come from groups associated with the universities and the professional societies whose primary aim is to increase the skills of their students and members, and to protect the public from the indiscriminate exercise of inferior skills. Progress will be achieved gradually through the process of education of practitioners, not through the sudden increase in the distribution of services before properly qualified men have been trained to perform them.

In Memoriam

Robert Dunn
1872-1937

In the passing of Dr. Robert Dunn on September 26, 1937, orthodontia loses one of its most useful practitioners. He was born at Monmouth, Illinois, March 22, 1872.

He was graduated from the Dental College of the University of Denver in 1898, and later studied orthodontia with Dr. Edward H. Angle in the 1902 Class. In November of that year he removed to San Francisco to pursue the practice of orthodontia, and was the first man on the Pacific Coast to limit his practice to this department of dentistry. Following the disastrous fire of 1905, he moved his family across the bay to Oakland. He also maintained an office there in addition to one in San Francisco, this arrangement still being in effect at the time of his death.

He was imbued with high ideals, and his native sense of integrity and tireless energy brought him to a high place among the orthodontists of the world. His confreres frequently sought his counsel, and never found him too busy to advise and encourage in the solution of difficult problems in their practice.

Orthodontic literature attests Dr. Dunn's great interest in one of the outstanding problems in practice; namely, that having to do with the vertical relation of the dental arches. Early he came to see that this important consideration was being overlooked in a great number of cases with resultant ultimate failure of treatment. Doubtless his studies of this problem which he reported in numerous papers and addresses went far in arousing orthodontists to the vital need of reform in matters of both diagnosis and technical procedure.

The Pacific Coast Society of Orthodontists, of which Dr. Dunn was a charter member and first president, owes much to his counsel and helpfulness. He was also one of the early members of the American Society of Orthodontists and was faithful to its tenets and obligations through this entire period of his professional life.

The specialty is the richer because of his splendid example of earnest application and contributions to his chosen work. May the men in our ranks emulate him in striving for the same high goal that actuated him throughout his professional career.

Dr. Dunn is survived by his widow, Eleanor Benedict, and six children: Mrs. G. S. Brand, Dr. J. Elliott Dunn (who succeeds his father in practice), Catharine, Phillip, Leslie, and Robert.

News and Notes

American Board of Orthodontia

Certificates of qualification as orthodontists were awarded by the American Board of Orthodontia in April, 1937, to the following:

Dr. Josephine M. Abelson, 136 E. 36th St., New York, N. Y.
Dr. Spencer R. Atkinson, First Trust Bldg., Pasadena, Calif.
Dr. Allan G. Brodie, 30 N. Michigan Blvd., Chicago, Illinois.
Dr. George S. Callaway, 576 Fifth Ave., New York, N. Y.
Dr. Jesse S. Cunningham, 3306 Fannin St., Houston, Texas.
Dr. Arlo M. Dunn, Medical Arts Bldg., Omaha, Nebraska.
Dr. Wm. J. Fitzpatrick, Olympia Bldg., Miami, Florida.
Dr. Clifford G. Glaser, 675 Delaware Ave., Buffalo, N. Y.
Dr. Willard A. Gray, Medical Arts Building, Rochester, N. Y.
Dr. F. E. Haberle, 55 E. Washington St., Chicago, Illinois.
Dr. George W. Hahn, 2490 Channing Way, Berkeley, Calif.
Dr. Wm. Paul Hoffman, 1835 Eye St., Washington, D. C.
Dr. Asa J. LaGrow, 715 Lake St., Oak Park, Illinois.
Dr. Moe Bernard Markus, Central Medical Bldg., Philadelphia, Pa.
Dr. Norborne F. Muir, Shenandoah Life Bldg., Roanoke, Virginia.
Dr. Chas. H. Patton, 215 S. 15th St., Philadelphia, Pa.
Dr. Leo M. Shanley, 7800 Maryland Ave., Clayton, Missouri.
Dr. Ralph W. Short, 520 Beacon St., Boston, Massachusetts.
Dr. Richard A. Smith, 636 Church St., Evanston, Illinois.
Dr. Earl H. Teetzel, David Whitney Bldg., Detroit, Michigan.
Dr. A. LeRoy Thomas, Medical Arts Bldg., Minneapolis, Minn.
Dr. Arthur B. Thompson, Equitable Bldg., Des Moines, Iowa.
Dr. Leonard T. Walsh, Thatcher Bldg., Pueblo, Colorado.
Dr. Louis S. Winston, 4115 Fannin St., Houston, Texas.

International College of Dentists

The next annual meeting of the International College of Dentists, United States Section, will be held at the Stevens Hotel in Chicago, February 13, 1938.

Dr. Elmer S. Best, Registrar
801 Medical Arts Bldg.
Minneapolis, Minn.

Five State Post Graduate Clinic

The District of Columbia Dental Society will conduct the Five State Post Graduate Clinic on March 6-9, 1938, at the Mayflower Hotel, Washington, D. C.

Southern Society of Orthodontists

The sixteenth annual meeting of the Southern Society of Orthodontists will be held at the Hotel Cleveland, Spartanburg, South Carolina, on February 7 and 8, 1938. All ethical members of the dental and medical professions are cordially invited.

CLYDE O. WELLS, President,
828 Montgomery Building,
Spartanburg, S. C.

WILLIAM P. WOOD, JR., Secretary,
442 W. Lafayette Street,
Tampa, Florida.

North Carolina Dental Society

The sixty-fourth annual meeting of the North Carolina Dental Society will be held at the Robert E. Lee Hotel in Winston-Salem, N. C., May 2-4, 1938. All members of the American Dental Association are cordially invited to attend.

FRANK O. ALFORD, Sec.-Treas.,
1109 First National Bank Bldg.,
Charlotte, N. C.

Thos. P. Hinman Midwinter Clinic

The twenty-fourth annual session of the Thos. P. Hinman Midwinter Clinic will be held at the Biltmore Hotel, Atlanta, Ga., March 14 and 15, 1938.

Horace Wells Anesthesia Society

On Thursday, September 30, 1937, at a meeting held at the Hotel St. George, there was organized the Horace Wells Anesthesia Society.

The organizing group was composed of fifty general practitioners interested in the advancement of nitrous oxide and oxygen anesthesia.

Various committees were appointed, and officers selected for the ensuing year were: President, Dr. N. Kaplan; Vice-President, Dr. Bromberg; Treasurer, Dr. Diamond; Secretary, Dr. Garland.

An interesting and instructive program is being worked out for the coming meetings. Men of note in the field of anesthesia will address the group at each quarterly meeting.

From the enthusiasm shown by those at the organization meeting, the Horace Wells Anesthesia Society has a brilliant and worthwhile future.

Second Summer Seminar

The second summer seminar for the study of orthodontics was held July 17 through July 25 at the University of Colorado School of Medicine in Denver.

Following the informal plan of the first summer seminar, material was presented relating to: orthodontics with reference to the constitutional background of the patient; bone pathology and its orthodontic significance; case analysis; treatment planning; appliance construction; radiography and photography.

According to report from Denver it was the expressed wish of those attending that the summer seminar be continued as an annual event, and plans were made for a third meeting to be held in the summer of 1938 at a time convenient for those wishing to attend the meeting of the American Society of Orthodontists.

Rocky Mountain Society of Orthodontists

The Rocky Mountain Society of Orthodontists will hold its midwinter meeting at the Shirley-Savoy Hotel, Denver, January 9-12, 1938. Dr. John C. Rosnik, 1014 Republic Building, Denver, is in charge of the arrangements.

Dr. Albert P. Horton, General Chairman,
206 Metropolitan Building,
Denver, Colo.

Dr. C. E. Westerberg, Secretary-Treasurer,
846 Metropolitan Building,
Denver, Colo.

Dallas Midwinter Dental Clinic

The Eleventh Annual Meeting of the Dallas Midwinter Dental Clinic, sponsored by the Dallas County Dental Society, will be held at the Hotel Adolphus, Dallas, Texas, January 17, 18, and 19, 1938.

At this meeting postgraduate instruction will be given in the major branches of dentistry by out-standing national clinicians, to be announced later.

A cordial invitation is extended to every dentist who is a member of the American Dental Association. For information, write Dr. T. A. Lipscomb, 1614 Medical Arts Building, Dallas, Texas.

Pacific Coast Society of Orthodontists

Central Section

The regular meeting of the Central Section was held at Oakland, California, on June 8. Dr. George Hensel, Instructor in Orthopedic Surgery, University of California, read an instructive paper on osteotomy of the mandible, illustrated with lantern slides which graphically demonstrated his treatment of anterior occlusion or Class III malocclusion (Angle) by surgical resection in the region of the rami. Discussion by the members followed.

Southern Section

The regular quarterly meeting of the Southern Section of the Pacific Coast Society of Orthodontists was held at the University Club in Los Angeles on June 11. Dr. Fairman Fahrney gave an excellent presentation of the benefits resulting from a careful photostatic technique. The paper was followed by lantern slides illustrating the suggested technique.

Great Lakes Association of Orthodontists

The Great Lakes Association of Orthodontists met November 1 and 2 at the Cleveland Hotel in Cleveland.

An excellent program was presented: "Shapes of Faces and Occlusion of Teeth" by Milo Hellman, New York; "Orthodontic Procedure Based Upon a Consideration of Indi-

vidual Differences'' by Charles M. Waldo, Denver; Dr. Byron O. Hughes of the University of Michigan presented a paper descriptive of an orthodontic research program on heredity in relation to dental and facial deformities.

In addition to the essays, there were case reports on cases started in the past year. This was the first presentation of these cases, and progress will be presented from year to year until the cases are completed. The casts, radiographs, appliances, and records were presented as clinics.

Dr. Weston Price of Cleveland presented an interesting illustrated lecture of his travels among primitive races; his talk had a direct bearing on orthodontic problems.

Marquette University Dental Alumni Association

The Thirty-First Annual Meeting of the Marquette University Dental Alumni Association will be held November 11 and 12.

Testimonial Luncheon for Dr. John V. Mershon

A testimonial luncheon was tendered Dr. John V. Mershon by members of his various postgraduate classes at the Edgewater Beach Hotel, Chicago, on Tuesday, April 21, 1937, during the session of the annual meeting of the American Society of Orthodontists. Some eighty men attended the luncheon to ''Uncle John.'' Dr. Paul G. Spencer, President of the American Society of Orthodontists, graciously extended the greetings of the Society to Dr. Mershon. Dr. Joseph B. Eby, in his inimitable way, made the presentation speech and gave to Dr. Mershon the gift selected for him, which was a sterling silver chop platter. The inscription on the platter reads ''Presented with sincere appreciation to Dr. John V. Mershon, April 21, 1937, by his postgraduate classes.'' A souvenir folder, containing letters of appreciation of ''Uncle John'' written by other class members who were unable to attend, was given to Dr. Mershon after it was autographed by every member present.

Note of Interest

Dr. Adelbert Fernald has removed his office from 71 Main Street, Andover, to the Phillips Academy, in Andover, Mass., where he has been appointed orthodontist for the students.